AUSTRALIAN AND NEW ZEALAND COLLEGE OF VETERINARY SCIENTISTS

FELLOWSHIP GUIDELINES

Veterinary Emergency Medicine and Critical Care

ELIGIBILITY

1. The candidate shall meet the eligibility prerequisites for Fellowship outlined in the *Fellowship Candidate Handbook.*
2. Membership of the College must be achieved prior to the Fellowship examination.
3. Membership may be in Emergency Medicine and Critical Care, Anaesthesia and Critical Care or Anaesthesia and Analgesia, Veterinary Practice (Small Animal), Small Animal Medicine, Medicine of Cats, Medicine of Cats UK or Small Animal Surgery.

OBJECTIVES

To demonstrate that the candidate has attained sufficient knowledge, training, experience, and accomplishment to meet the criteria for registration as a specialist in Veterinary Emergency Medicine and Critical Care.

RESPONSIBILITY

It is the candidate's responsibility to ensure they have fulfilled all the requirements of the training program guidelines prior to submitting their credentials for eligibility for examination.

LEARNING OUTCOMES

Definitions:

Emergency: a condition that requires immediate attention in order to prevent deterioration or death.

Critical illness: conditions that affect organ/system function and require dedicated in-hospital treatment and monitoring to prevent deterioration while the underlying problem is being treated. The condition may or may not be life threatening.

Emergency and Critical Care: the discipline of veterinary medicine that focuses upon diagnosis and resolution of problems in both emergency and critically ill patients.

1. The candidate will have a **detailed**[1] knowledge of:

    1.1. The physiology of the cardiovascular, genito-urinary, respiratory, alimentary, musculoskeletal, endocrine, haemo-lymphatic, ophthalmological and neurological organ systems.

    1.2. The diagnosis, differential diagnosis and treatment of critical illness and emergency conditions in the dog and cat.

    1.3. The aetiology, pathogenesis and pathophysiology of cardiovascular, genito-urinary, respiratory, alimentary, musculoskeletal, endocrine, haemo-lymphatic, ophthalmological and neurological organ dysfunction in the cat and the dog.

    1.4. The aetiology, pathogenesis and pathophysiology of problems in critically ill patients.

    1.5. The surgical anatomy and pathology related to emergency conditions.

    1.6. Diagnostic tests and procedures as these apply to the diagnosis of critical illness and emergency disease conditions in the cat and the dog.

    1.7. Critical care medicine as it applies to the cat and the dog.

    1.8. Advanced monitoring techniques utilised in the ICU, including their clinical application and implications.

2. The candidate will have a **sound**[1] knowledge of:

    2.1. Canine and feline anatomy, physiology and pharmacology.

    2.2. Chemotherapeutics used for the treatment, control and management of critical illness and emergency disease conditions in the cat and the dog.

    2.3. Canine and feline nutrition and husbandry, especially as it applies to the management of disease conditions.

    2.4. Internal medicine, clinical pathology, anaesthesia and diagnostic imaging as they apply to the diagnosis and management of emergency and critically care cases.

    2.5 The surgical options, complications and outcomes of emergency conditions including but not limited to such examples as: gastric dilation and volvulus surgery with gastropexy, splenectomy, gastrointestinal foreign body removal, caesarean section, liver lobectomy, pyometra, ovariohysterectomy, diaphragmatic hernia repair, wound management including debridement and the use of appropriate drainage techniques.

[1] Knowledge Levels:
Detailed knowledge - candidates must be able to demonstrate an in-depth knowledge of the topic including differing points of view and published literature. The highest level of knowledge.
Sound knowledge – candidate must know all of the principles of the topic including some of the finer detail, and be able to identify areas where opinions may diverge. A middle level of knowledge.
Basic knowledge – candidate must know the main points of the topic and the core literature.

3. The candidate will be able to, with a **detailed**[2] level of expertise:

    3.1. Collect, interpret and record clinical data in canine and feline emergency cases including:

        3.1.1. Historical and physical examinations of all body systems: detailed diagnostic expertise is required.

        3.1.2. The results of clinical pathology investigations; detailed diagnostic expertise is required.

    3.2. Perform the following technical procedures:

        3.2.1. Positive pressure ventilation

        3.2.2. Oxygen delivery techniques including high-flow nasal cannula

        3.2.3. Intravenous fluid therapy

        3.2.4. Transfusion therapy

        3.2.5. Central line placement and central venous pressure measurement

            3.2.5.1. Peripherally inserted central venous catheter (PICC)

        3.2.6. Arterial catheter placement and arterial blood gas collection

        3.2.7. Blood pressure measurement (direct and indirect)

        3.2.8. Body cavity centesis and drain placement: thoracic, abdominal, pericardial

            3.2.8.1. Use of continuous suction systems

        3.2.9. Electrocardiography (routine)

        3.2.10. Partial and total parenteral nutrition

        3.2.11. Enteral nutrition tube placement

            3.2.11.1. Naso-oesophageal

            3.2.11.2. Nasogastric

            3.2.11.3. Oesophagostomy

            3.2.11.4. Gastrostomy

        3.2.12. Peritoneal dialysis

        3.2.13. Closed and open chest CPR

        3.2.14. Cardiac output monitoring

        3.2.15. Surgical airway access including tracheostomy and cricothyrotomy

        3.2.16. Point-of-care ultrasound techniques

        3.2.17. Toxicological decontamination techniques

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[2] **Skill levels**:
Detailed expertise – the candidate must be able to perform the technique with a high degree of skill, and have extensive experience in its application. The highest level of proficiency.
Sound expertise – the candidate must be able to perform the technique with a moderate degree of skill, and have moderate experience in its application. A middle level of proficiency.
Basic expertise – the candidate must be able to perform the technique competently in uncomplicated circumstances.

3.3. Analyse complex clinical problems and make sound clinical judgements.

3.4. Communicate effectively with clients, referring veterinarians and peers.

3.5. Integrate these skills to provide high-quality care for cats and dogs with the most efficient use of resources in a manner that is responsive to the owner's needs and wishes.

3.6. Evaluate and incorporate new scientific information relevant to the practice of emergency medicine and critical care.

3.7. Advance knowledge in emergency medicine and critical care through clinical innovation, research and publication.

4. The candidate will be able to, with a **sound** level of expertise:

4.1. Interpret Diagnostic Imaging Results and Reports

4.1.1. Acquire and interpret the results of diagnostic imaging examinations including radiography and ultrasound.

4.1.2. Interpret written radiologist reports for advanced diagnostic imaging examinations including but not limited to fluoroscopy, computed tomography and magnetic resonance imaging.

4.2. Perform the following surgical procedures:

4.2.1. Gastric dilation and volvulus surgery with gastropexy

4.2.2. Splenectomy

4.2.3. Gastrointestinal foreign body removal

4.2.4. Exploratory laparotomy

4.2.5. Caesarean section

4.2.6. Pyometra ovariohysterectomy

4.2.7. Diaphragmatic hernia repair

4.2.8. Wound management including debridement, suture placement, use of appropriate drainage techniques

4.2.9. Cystostomy tube placement

4.2.10. Wound management and temporary stabilisation of open fractures and shearing injuries

4.3. Perform the following technical procedures:

4.3.1. Joint fluid aspiration

4.3.2. Bone marrow biopsy and aspiration

4.3.3. Cerebrospinal fluid collection

4.3.4. Endoscopy of the respiratory and alimentary tracts

4.3.5. Transtracheal aspiration and bronchoalveolar lavage

4.3.6. Biopsy techniques (fine needle aspiration, with and without imaging guidance).

4.3.7. Radiographic contrast studies of the gastrointestinal and urinary systems

4.3.8. Abdominal ultrasound and basic echocardiography

5. The candidate will be able to, with a **basic** level of expertise:

5.1. Interpret Diagnostic Imaging Results

5.1.1. Directly interpret the imaging results of advanced diagnostic imaging examinations including but not limited to fluoroscopy, computed tomography and magnetic resonance imaging.

EXAMINATIONS

Refer to the *Fellowship Candidate Handbook*, Section 5.
The Fellowship examination has **four separate, autonomous components**:

1. **Written Paper 1** *(Component 1)*
   Principles of the Subject (four hours)

2. **Written Paper 2** *(Component 2)*
   Applied Aspects of the Subject (four hours)

3. **Practical Examination** *(Component 3)*
   Practical **(**two and a half hours)

4. **Oral Examination** (*Component 4*)
   Oral (approximately one hour)

The written examination will comprise of two separate four-hour papers taken on two consecutive days. There will be an additional 20 minutes perusal time for each paper, during which no typing is permitted. Paper 1 and paper 2 will comprise a total of 240 marks each. The written examinations may include a combination of essay-style, short-answer and multiple-choice questions. Each question may include multiple sub-sections. There is no choice of questions. Marks allocated to each question and to each sub-section of questions will be clearly indicated on the written paper. All written examinations will be via the online platform.

Written Paper 1:

This paper is designed to test the candidate's knowledge of the principles of Veterinary Emergency Medicine and Critical Care as described in the Learning Outcomes. Answers may cite specific examples where general principles apply but should primarily address the theoretical basis underlying each example.

Written Paper 2:

This paper is designed to (a) test the candidate's ability to apply the principles of Veterinary Emergency Medicine and Critical Care to particular cases/problems or tasks, and to (b) test the candidate's familiarity with the current practices and current issues that arise from activities within the discipline of Veterinary Emergency Medicine and Critical Care in Australia and New Zealand. The candidate may be required to demonstrate an understanding of pathophysiology in this examination to justify the recommended approach to patient management.

Practical Examination:

The practical examination is designed to test practical aspects of the Learning Outcomes. The practical examination may consist of a combination of radiographic and ultrasound images, electrocardiographs, cytological samples, computer-based problem solving and clinical pathology data with associated questions. The scope of the examination will not necessarily be restricted to these types of data. Typed answers will be required. No perusal time will be given for the practical exam. The practical examination will equate to a total of 150 marks. Marks allocated to each question and to each sub-section will be clearly indicated. The practical examination will be via the online platform.

Oral Examination:

The oral examination will be approximately one hour in duration and is designed to test practical aspects of the Learning Outcomes. To pass this examination, the candidate must be aware of current literature and be able to debate on controversial issues. Four (4) cases are presented with supporting questions asked verbally in a face-to-face setting. The oral examination has a total of 60 marks with each case allocated 15 marks. Diagnostic images such as radiographs, ultrasound frames or video loops, and CT as well as laboratory test results; electrocardiographs and images of equipment may be used during this examination.

TRAINING PROGRAMS

In addition to the Requirements of the *Fellowship Candidate Handbook* the VEMCC Fellowship Guidelines impose the requirements as detailed below:

Refer to Appendix 3: Clinical Skills Checklist and Appendix 4: Clinical Knowledge Checklist for helpful guides to the breadth of technical procedures and clinical knowledge that should be accomplished by the candidate during training. These lists are not exclusive and are guides only.

FULL TIME FORMAL TRAINING PROGRAM REQUIREMENTS

The period of training is a minimum of 121 weeks.

This will take the form of a structured residency training program over three years consisting of a minimum of 96 weeks of full-time, directly supervised training in veterinary emergency medicine and critical care and allied specialties. In addition, candidates will complete 25 weeks of independent practice.

These are requirements are the minimum necessary to meet credential requirements. Training programs are expected to span 3 years to allow for flexibility and annual leave / study leave.

1. 96 weeks full time Directly Supervised Training.

This includes:

1.1. 78 weeks of Directly Supervised Training in the discipline of Veterinary Emergency and Critical Care.

1.1.1. 74 weeks (minimum) Directly Supervised Training in emergency and critical care at either the primary or secondary training facility. A minimum of 50% (37 weeks) of this training must be under supervision of the primary supervisor and a minimum of 20% (15 weeks) under the supervision of the secondary supervisor.

1.1.2. 4 weeks (minimum) Externship/s (see the *Fellowship Candidate Handbook* for additional details). Externships are completed at a different institution to the primary or secondary training facility . These four weeks are to consist of either two separate two-week blocks at two different institutions or one four-week block at the same institution.

1.2. 1.3. Training in Related Disciplines (TRD): directly supervised training in disciplines related to but other than the primary discipline.

1.2.1. Eighteen weeks (= 90 days) of directly supervised training in related specialties, supervised by a recognised specialist in that specialty discipline

1.2.2. The following core rotations and time periods must be completed:

Small Animal Surgery 4 weeks

Small Animal Medicine	4 weeks
Anaesthesia and Analgesia	2 weeks
Diagnostic Imaging	2 weeks
Small Animal Neurology	2 weeks
Small Animal Cardiology	1 week

The final three weeks are elective and can be chosen from ophthalmology, oncology, clinical pathology and Human Intensive Care. Electives must be performed in blocks of minimum 1 and maximum 2 weeks.

1.2.3. Guidelines for TRD are to be found in **Appendix 2.**

1.3. Conferences/courses/other training sessions

1.3.1. Seminars and conferences in an aspect of the discipline where at least 25% of the sessions attended are presented by a recognised specialist in Emergency Medicine and Critical Care.

1.3.2. All seminars and conferences must be documented (title, date, location, speaker, length).

2. 25 weeks independent practice in a 24-hour emergency facility

Independent practice should not be undertaken until at least 3 months of DST has been completed. Independent practice is defined as full-time work in an approved facility that complies with the minimum standards for 24-hour facilities. A 24-hour facility is defined as one in which both veterinary and support staff are available for treatment of new accessions and hospitalised animals 24 hours a day, 7 days a week. This work may focus on clinical practice or supervisory duties. Direct daily contact with the supervisor is not required but an Activity Log Summary must be maintained throughout this period as per:

2.1. Template *Activity Log Summary* (By Species), **Appendix 1a**

and

2.2. Template *Activity Log Summary* (By Body System)**, Appendix 1b.**

Details of the work to be undertaken during this period must be clearly indicated in the training program submission. The name of the practice and location may be approved by the TCC *after* the training program has commenced but approval must be obtained *before* this time is started.

3. Activity log summary requirements

The Activity Log Summary (ALS) must be recorded throughout supervised training in the primary discipline. It should be divided by species and body system using the

template examples provided in **Appendix 1.** The Activity Log Summary shall use the following categories:

- Neurological
- Haemo-lymphatic
- Endocrine
- Respiratory
- Cardiovascular
- Alimentary
- Genito-Urinary
- Musculo-Skeletal
- Ophthalmological
- Miscellaneous other (including dermatological, behavioural, etc)

The candidate must keep a log of **ALL** cases managed as described in Appendix 1.

The candidate is required to log at least 500 cases during the training program across the breadth of body systems, including a minimum of 150 cases of each of the major species (feline and canine).

In an attempt to ensure adequate exposure to the variety of medical cases seen, the Chapter suggests the following minimum of cases per body system (as set out in the Activity Log Summary):

Neurological	30
Haemo-lymphatic	30
Endocrine	30
Respiratory	30
Cardiovascular	30
Alimentary	30
Genito-Urinary	30
Musculo-Skeletal	30
Ophthalmological	20
Miscellaneous	10

Any single case can be allocated to a single organ system that most appropriately describes the major clinical problem.

4. Teaching requirements: Both of the following requirements must be met:

4.1. At least six hours of formal lectures on emergency/critical care topics to veterinary students, veterinary nurses, staff or veterinary audiences. The intention of this requirement is to give the resident an opportunity to extensively research and prepare a formal presentation to teach a veterinary audience in the style of a lecture. As such, the following would be expected of a formal lecture: advanced notification and promotion of the event, a substantial audience of at least 10 or more people, preparation of explanatory material to assist the presenter (e.g., a PowerPoint presentation), a handout for attendees to use as reference material and be presented live such that the audience can ask questions of the presenter.

and

4.2. Teaching in clinical or laboratory settings for a minimum of six hours. It is expected that these sessions teach a practical, hands-on skill, and that the resident has thoroughly researched and practised those skills themselves in advance of the session. The intention of and requirements would be the same as for a formal lecture, however a smaller audience would be acceptable. A hands-on component is required, and the resident must have mastered the skill themselves and be thoroughly informed of the literature relating to the skill in order to effectively train others in this skill. It is not a requirement that these are wet laboratories with cadavers.

All teaching activities must be documented using the template provided in Appendix 5. and submitted as part of the Credentials document. Credit will only be given once for a topic. **Educational requirements:** two (2) of the following three requirements must be met:

4.3. Active participation for a minimum of two years in seminars on a wide range of topics related to emergency and critical care. The intention of the seminars is to provide mentored exposure to the fundamentals of the discipline at a specialist level and critical evaluation of the scientific literature.

4.3.1. Active participation is defined as attendance and participation in seminars on a rostered basis.

4.3.2. This training may be received at a veterinary or human training facility.

4.3.3. A registered specialist must be in attendance.

4.3.4. All seminars and conferences must be documented using the template provided in Appendix 6.

4.3.5. Must comprise at least 100 hours accrued over not less than two years.

4.3.6. Seminars would include activities such as journal club, morbidity and mortality rounds and pathophysiology reviews.

4.4. A minimum of 50 hours continuing education gained at not less than two conferences in the subject of VEMCC.

4.5. Participation in a post graduate degree or fellowship program in an allied biomedical science (e.g. physiology, pharmacology, cardiovascular studies, toxicology) involving didactic courses and research experience that is associated with the discipline of emergency/critical care.

Pre-approval of the post-graduate degree or fellowship program must be obtained at the time the training document is submitted.

REQUIREMENTS OF SUPERVISORS

As of July 20204, all new Fellowship Candidates must have a minimum of two Supervisors in Veterinary Emergency and Critical Care: a Primary Supervisor and a Secondary Supervisor. The candidate must be working full-time in the discipline of veterinary emergency and critical care, and must be under direct supervision by one or both supervisors for a minimum of 25-hours per week of Directly Supervised Training. Direct supervision is defined as in-person, on-site consultation between the candidate and supervisor throughout the shift to provide opportunity for co-operative or interactive case management.

The following are the requirements of Supervisors:

1. Primary Supervisor: must hold a Specialist qualification in veterinary emergency and critical care (i.e., Fellowships, American/European Diplomate). This supervisor is able to provide Directly Supervised Training in the subject of Veterinary Emergency Medicine and Critical Care and must be the supervisor present for >50% of those training weeks. The Primary Supervisor must be on-site at the primary training facility.

2. Secondary Supervisor: must hold a Specialist qualification in Emergency and Critical Care (i.e., Fellowships, American/European Diplomate). This supervisor is able to provide Directly Supervised Training in the subject of Veterinary Emergency Medicine and Critical Care and is the supervisor present for at least 20% of those training weeks (minimum 15 weeks). This Supervisor may be off-site. In this event, the candidate will undertake directly supervised training with the secondary supervisor onsite at the secondary location (providing that the secondary site has been approved by the TCC as a training facility).

PUBLICATIONS AND PRESENTATION

Refer to the *Fellowship Candidate Handbook* **Section 2.10**
Appropriate forums for Presentation include but are no limited to IVECCS, EVECCS and ANZCVS Science Week.

RECOMMENDED READING LIST

The candidate is expected to research the depth and breadth of the knowledge of the discipline. This list is intended to guide the candidate to some core references and source material. It is neither proscriptive nor restrictive. The list is not comprehensive and is not intended as an indicator of the content of the examination.

Textbooks (core texts are marked with an *)[3]

General Physiology*
One of:

1. Ganong's Review of Medical Physiology Barrett KE, Barman SM, Brooks JL, Yuan J. 26th ed., 2019
2. Medical Physiology: A Cellular and Molecular Approach, Boron WF, Boulpaep, EL 3rd ed., 2017
3. Textbook of Medical Physiology 14th Ed, Guyton and Hall, 2020
4. Berne & Levy Physiology 8th ed, Koeppen & Stanton, 2023

Respiratory Physiology*
One of:

1. Respiratory Physiology: The Essentials 11th ed, West, 2020
2. Nunn's Applied Respiratory Physiology 9th ed, Lumb, 2020

Supplementary (optional):

1. Pulmonary Pathophysiology: The Essentials 10th ed, West and Luks, 2021

Cardiovascular Physiology*
One of:

1. Cardiovascular Physiology 11th ed, Levy and Pappano, 2019
2. Cardiovascular Physiology 9th ed, Mohrman and Heller Lange Series, 2018
3. Cardiovascular Physiology Concepts 3rd ed, Klabunde, 2021

Renal Physiology*
One of:

1. Vander's Renal Physiology 9th ed, Eaton & Pooler 2018
2. Renal Physiology 6th ed, Koeppen, Stanton 2018
3. Clinical Physiology of Acid-Base and Electrolyte Disorders 5th ed, Rose & Post, 2001

Human Intensive Care
One of:

1. Textbook of Critical Care 8th ed, Vincent, Abraham, Kochanek, Moore, Fink, 2023
2. Critical Care Medicine Principles of Diagnosis & Management in the Adult 5th ed, Parrillo & Dellinger, 2019
3. Civetta, Taylor and Kirby's Critical Care 5th ed, Gabrielli, Layon, Yu. 2018

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[3] Textbook Definitions:
Core textbook – candidates are expected to own a copy of the textbook and have a detailed knowledge of the contents.
Recommended textbook – candidates should own or have ready access to a copy of the book and have a sound knowledge of the contents.
Additional references – candidates should have access to the book and have a basic knowledge of the contents
Additional Reading Materials - These are conference proceedings, other non-refereed publications and other journals that would offer some information in the subject area including differing points of view, but are not required reading.

AND

4. The ICU Book, 4th ed, Marino, 2013*

Fluid Therapy / Acid-Base / Electrolyte *

1. Fluid, Electrolyte, and Acid-Base Disorders in Small Animal Practice 4th ed, Di Bartola 2011

Veterinary Emergency and Critical Care

1. Small Animal Critical Care Medicine 3nd ed, Silverstein & Hopper, 2022*
2. Advanced Monitoring and Procedures for Small Animal Emergency and Critical Care, 2nd ed., Burkett-Creedon and Davis, 2023*
3. Manual of Small Animal Emergency & Critical Care Medicine 2nd ed, Macintire *et al*, 2012
4. Veterinary Emergency and Critical Care Procedures 2nd ed, Hackett & Mazzaferro, 2012
5. Textbook of Small Animal Emergency Medicine 1st Ed Drobatz, Hopper, Rozanski, Silverstein 2018

Veterinary Internal Medicine

1. Textbook of Veterinary Internal Medicine 9th ed, Ettinger & Feldman 2023

Veterinary Surgery
One of:

1. Veterinary Surgery: Small Animal, Tobias and Johnston, 2nd ed 2017
2. Small Animal Surgery 5th ed, Fossum. 2018

Veterinary Cardiology
One of:

1. Manual of Canine and Feline Cardiology 5th ed, Smith *et al*, 2015
2. Cardiovascular Disease in Companion Animals: Dog, Cat and Horse, Ware, Wendy A, 2nd Ed. 2021

Veterinary Anaesthesia and Analgesia
One of:

1. Veterinary Anesthesia & Analgesia 5th ed, Grimm et al, 2015
2. Veterinary Anaesthesia 2nd ed, Dugdale, 2020
3. Handbook of Veterinary Anesthesia 5th Ed, Muir & Hubbell, 2012

Mechanical Ventilation
One of:

1. Essentials of Mechanical Ventilation 4th ed, Hess & Kacmarek, 2018
2. Principles and Practice of Mechanical Ventilation 3rd ed, Tobin, 2012
3. Mechanical Ventilation: Physiological and Clinical Applications 8th ed, Cairo, 2023

Veterinary Pharmacology
One of:

1. Small Animal Clinical Pharmacology and Therapeutics 2nd ed, Boothe, 2011
2. Small Animal Clinical Pharmacology 2nd ed, Maddison *et al*, 2008

Veterinary Toxicology*
One of:

1. Veterinary Toxicology: Basic and Clinical Principles 3nd ed, Gupta, 2018
2. Small Animal Toxicology 3rd ed, Peterson & Talcott, 2013

Veterinary Clinical Pathology
One of:

1. Duncan & Prasse's Veterinary Laboratory Medicine: Clinical Pathology 5th ed, Latimer, 2011
2. Small Animal Clinical Diagnosis by Laboratory Methods 5th ed, Willard & Tvedten, 2012
3. Fundamentals of Veterinary Clinical Pathology 2nd ed, Stockham & Scott, 2008

Veterinary Pneumology

1. Clinical Canine and Feline Respiratory Medicine, Johnson, 2010

Veterinary Endocrinology

1. Canine and Feline Endocrinology 4th edition, Feldman & Nelson 2015

Veterinary Infectious Diseases

1. Infectious Diseases of the Dog and Cat 5th ed, Greene 2022

Veterinary Ophthalmology
One of:

1. Essentials of Veterinary Ophthalmology 3rd ed, Gelatt, 2014
2. Slatter's Fundamentals of Veterinary Ophthalmology 5th ed, Maggs, Miller & Ofri, 2013

Veterinary Neurology
One of:

1. Handbook of Veterinary Neurology 5th ed, Lorenz, Coates & Kent, 2010
2. A Practical Guide to Canine and Feline Neurology 3rd ed, Dewey, 2015
3. Veterinary Neuroanatomy and Clinical Neurology 5th ed, de Lahunta & Glass 2020
4. BSAVA Manual of Canine and Feline Neurology 4th ed, Platt and Olby, 2013
5. Small Animal Neurological Emergencies, Platt and Garosi, 2012

Veterinary Oncology
One of:

1. Withrow & MacEwen's Small Animal Clinical Oncology 6th ed, Vail, Thamm and Liptak, 2019
2. BSAVA Manual of Canine and Feline Oncology 3rd ed, Lascelles and Dobson, 2011

Veterinary Paediatrics
One of:

1. Small Animal Pediatrics: The First 12 Months of Life, Peterson & Kutzler, 2011
2. BSAVA Manual of Canine and Feline Reproduction and Neonatology 2nd ed, England & von Heimendahl, 2010

Journals[4]

The journals listed below contain original and review papers that are suitable for preparation for the Fellowship examination.

Titles in Veterinary Emergency and Critical Care

Journal of Veterinary Emergency and Critical Care
Journal of the American Veterinary Medical Association
American Journal of Veterinary Research
Veterinary Clinics of North America
Journal of Veterinary Internal Medicine
Australian Veterinary Journal
Australian Veterinary Practitioner
Journal of the American Animal Hospital Association
Journal of Feline Medicine and Surgery
Journal of Veterinary Cardiology
Veterinary Anaesthesia and Analgesia
Veterinary Surgery
Veterinary Radiology and Ultrasound
Frontiers in Veterinary Science (Veterinary Emergency and Critical Care section)

Titles in Human Emergency and Critical Care

Critical Care Medicine
Shock
Journal of Trauma
New England Journal of Medicine
Anaesthesia and Intensive Care
Chest
Critical Care Clinics
Current Opinion in Critical Care
Intensive Care Medicine

[4] Journal Definitions:
Core Journal – candidates are expected to have ready access to either print or electronic versions of the journal and have a detailed knowledge of the published articles in the subject area.
Recommended Journal – candidates should have ready access to either print or electronic versions of the journal and have a sound knowledge of the published articles in the subject area.
Additional Journal – candidates should be able to access either printed or electronic versions of the journal and have a basic knowledge of the published articles in the subject area.

FURTHER INFORMATION

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APPENDIX 1a **Activity Log Summary (By Species)** ***(Template):***

NAME: A. Candidate **SUBJECT: Veterinary Emergency Medicine and Critical Care** **DATE:**

Number of Cases

CATEGORY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Current TOTAL	Previous TOTAL	**Cumulative TOTAL**
CANINE	21	28	30	25	32	33									
FELINE	2	6	6	9	11	10									
OTHER	0	0	0	0	0	0									
Current TOTAL	23	34	36	34	43	43									
Previous TOTAL	0	0	0	0	0	0									
Cumulative TOTAL	23	34	36	34	43	43									

APPENDIX 1b Activity Log Summary (By Body System) *(Template)*

NAME: A. Candidate **SUBJECT: Veterinary Emergency Medicine and Critical Care** **DATE:**

Number of Cases/Activities

CATEGORY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Current TOTAL	Previous TOTAL	Cumulative TOTAL
Neurological															
Haemo-lymphatic															
Endocrine															
Respiratory															
Cardiovascular															
Alimentary															
Genito-urinary															
Musculoskeletal															
Ophthalmological															
Miscellaneous															
Current TOTAL															
Previous TOTAL															
Cumulative TOTAL															

Appendix 2: Training in related disciplines guidelines

Throughout the training program, the candidate must be exposed to and actively involved in training in several related disciplines. The candidate is encouraged to develop a working relationship with one or more specialists in each discipline to facilitate regular discussion and interaction regarding case management. In addition, involvement and participation of a specialist in these disciplines in clinical rounds and seminars attended by the candidate is encouraged, as is participation of the candidate in relevant rounds and seminars specific to this discipline.

The candidate must ensure that time spent in training in related disciplines is effective in consolidating knowledge and skills and in covering aspects of this discipline that will not be addressed adequately during the remainder of their program. The candidate is expected to be proactive in searching out opportunities, materials and expert tuition and in compiling and organizing relevant material for future reference.

Training in the related discipline of small animal surgery

Essential areas that should be covered include but are not limited to:

1. Principles of asepsis and surgical sterility
2. Tissue handling techniques including suturing patterns, use of stapling and drainage devices.
3. The approach to common surgical emergencies including but not limited to gastric dilation and volvulus surgery with gastropexy, splenectomy, gastrointestinal foreign body removal, caesarean section, liver lobectomy, pyometra, ovariohysterectomy, diaphragmatic hernia repair, wound management including debridement and the use of appropriate drainage techniques.

Training in the related discipline of small animal medicine

Essential areas that should be covered include but are not limited to:

1. Formulation of a treatment plan that encompasses the medical needs of the critically ill patient. Developing the ability to consider an overall view of the patient's situation should be promoted
2. Monitoring the patient's response to treatment and modifying treatment as indicated
3. Ongoing medical treatment after stabilisation of critical illness
4. Indications for laboratory and other diagnostic tests and interpretation of results

Training in the related discipline of diagnostic imaging

Training in this discipline is an extremely important component of the training program. Emergency clinicians may be directly responsible for performing (or supervising the performance of) and interpreting diagnostic imaging studies. It is essential that the candidate be competent in performing or supervising imaging studies, particularly using radiography and ultrasonography, and is able to perform the immediate and timely interpretation of findings, correlate these studies with clinical findings and make appropriate decisions for determining the treatment of the patient. A methodical and thorough approach to interpretation of images must be developed.

Topics to be reviewed throughout the training program, and techniques to gain practical experience with, include but are not limited to the following as they apply to the critically ill or emergency patient:

1. Principles, indications, limitations, application and interpretation of the following imaging modalities:
    1.1. Radiography including digital radiography, contrast radiography and fluoroscopy
    1.2. Ultrasonography including ultrasonography of the abdomen and thorax
    1.3. Computed tomography (CT)
    1.4. Magnetic resonance imaging (MRI)
    1.5. Storing images and construction of reports

Training in the related discipline of anaesthesia and analgesia

Topics to be reviewed throughout the training program and techniques to gain practical experience with include but are not limited to the following as they apply to critically ill or emergency patient:

1. Pain management

    1.1. Prevention and control of pain: pre-emptive analgesia, post-operative analgesic techniques, management of acute (including post-operative) and chronic pain

    1.2. Use of multi-modal analgesic plans including combination therapy, CRIs, epidural analgesia, transdermal analgesia and local blocks.

    1.3. Drug actions and interactions, indications and contraindications, and potential adverse effects.

2. Anaesthesia

    1.1. Pre-operative assessment and patient preparation: pre-anaesthetic evaluation and premedication

    1.2. Equipment used in general anaesthesia delivery and monitoring

    1.3. Pharmacology of drugs used for sedation/ tranquilization, analgesia, muscle relaxation and anaesthesia. Drug action and interaction. The effect of drugs on gastrointestinal motility, the cardiovascular and respiratory systems.

1.4. Application of analgesic techniques before, during and after a surgical procedure and knowledge of their influence on the course of anaesthesia

1.5. Anaesthesia induction, maintenance and recovery techniques in small animals

1.6. Tranquilization and anaesthesia in small animals

1.7. Airway maintenance, oxygenation and ventilation, acute respiratory failure

1.8. Special anaesthetic considerations: anaesthesia of the neonate, geriatric patient, patient with systemic disease (eg. SIRS, septic shock), neurological, renal, liver or respiratory disease and the trauma patient. Anaesthesia of small animals with acute abdomen and other acute abdominal surgeries

1.9. Monitoring during anaesthesia, effects on the respiratory and CV systems and support of these systems during anaesthesia

1.10. Prevention and management of anaesthetic accidents and crises

1.11. Post anaesthetic complications including the prevention, diagnosis and management of post-anaesthetic lameness in small animals

1.12. Current techniques used during recovery from general anaesthesia

1.13. Local and regional anaesthesia techniques used in small animals including dental nerve blocks, epidural and spinal anaesthesia.

Training in the related discipline of veterinary neurology

Topics to be reviewed throughout the training program and techniques to gain practical experience with include but are not limited to the following as they apply to critically ill or emergency patient:

1. The neurological examination
2. Diagnosis, support and treatment of central and peripheral neurological conditions including but not limited to head trauma, seizures, spinal injury, inflammatory brain disease, hepatic encephalopathy and neoplasia

Training in the related discipline of veterinary cardiology

Topics to be reviewed throughout the training program and techniques to gain practical experience with include but are not limited to the following as they apply to critically ill or emergency patient:

1. Evaluation of the cardiovascular system using ultrasound, ECG, radiography, cardiac biomarkers and blood pressure measurement.
2. Support and treatment of cardiac conditions in emergency and critically ill patients including but not limited to dilated cardiomyopathy, cardiomyopathy in cats, valvular

disease, arrhythmias, congestive heart failure, pericardial effusion, systemic and pulmonary hypertension and feline arterial thromboembolism.

3. Interpretation of echocardiographic findings.

Training in the related discipline of veterinary clinical pathology

The role of training in Clinical pathology is to provide guidance and training in pathology including the study and practice of current techniques used in tissue pathology and relevant aspects of microbiology, haematology, immunology and clinical chemistry as it applies to the critically ill and emergency patient.

Topics to be reviewed throughout the training program and techniques to gain practical experience will include but are not limited to the following as they apply to the critically ill and emergency patient.

1. A basic review of quality assurance and quality control to provide the candidate with an awareness of quality issues and procedures that reflect best practices for in-hospital testing and for commercial reference laboratories.
2. Basic knowledge of the time required to perform commonly requested tests and examinations.
3. An introduction to clinical pathology laboratory techniques including haematology, serum chemistry, cytology, urinalysis, abdominal and thoracic fluid analysis and aerobic and anaerobic culture techniques.
4. Review of common stains used for cytologic and histopathologic examination of samples.
5. Current techniques for the collection, transport, storage and preparation of a variety of surgical tissue biopsies.
6. Current techniques for the collection, transport, and storage of a variety of body fluids (including blood, peritoneal fluid and CSF) and aspirates for laboratory evaluation including cytology and culture.
7. Interpretation of laboratory results, understanding of pathologic and cytologic terminology and communication with the pathologist.

Training in the related discipline of veterinary ophthalmology

Topics to be reviewed throughout the training program and techniques to gain practical experience with include but are not limited to the following as they apply to critically ill or emergency patient:

1. Ophthalmologic examination including fundic exam and tonometry.
2. Diagnosis and treatment of ophthalmologic conditions in emergency and critically ill patients including but not limited to blindness, glaucoma, lens luxations, uveitis,

hyphema, conjunctivitis, corneal ulceration, penetrating ocular trauma, proptosis and cataracts.

Training in the related discipline of veterinary oncology

Topics to be reviewed throughout the training program and techniques to gain practical experience with include but are not limited to the following as they apply to critically ill or emergency patient:

1. Diagnostic techniques
2. Principles of treatment of neoplastic conditions in emergency and critically ill patients
3. Paraneoplastic syndromes
4. Adverse effects of chemotherapeutic drugs including neutropenia, gastrointestinal complications, organ failure and tumour lysis syndrome
5. Appropriate nursing considerations for animals receiving chemotherapeutic drugs including occupational health and safety concerns

Appendix 3: Clinical Skills Checklist

This list is intended as a guide to the breadth of technical procedures that should be accomplished by the candidate. It is not exclusive. Completion of the procedures is not indicative of completion of Fellowship training.

Vascular access techniques
Blood sampling: venous and arterial
Peripheral vein catheterisation
Central vein catheterisation
Arterial catheterisation
Intraosseous catheterisation

Cardiopulmonary Resuscitation (CPR)
Closed chest CPR
Open chest CPR
Post CPA care

Cardiovascular
Basic Echocardiogram (LA:Ao ratio, fractional shortening, identification of pericardial effusion)
Pericardiocentesis
Blood pressure measurement: direct and indirect methods
Central Venous Pressure measurement
Cardiac catheter placement and cardiac output monitoring (PCWP; calculation of indices) or
Lithium dilution cardiac output monitoring

Respiratory
Capnography ($ETCO_2$)
Pulse oximetry
Oxygen supplementation
Nebulization and coupage
Thoracocentesis
Thoracic drain placement and maintenance
Thoracic lavage
Continuous suction systems for thoracic drainage
Broncho-alveolar lavage, transtracheal wash
Tracheal endoscopy
Set up and maintenance of a patient on a ventilator
Endotracheal intubation for difficult airways
Tracheostomy: placement and maintenance
Emergency cricothyrotomy
Point of care thoracic ultrasound techniques

Abdominal
Point of care abdominal ultrasound techniques
Emergency abdominal surgeries as detailed in the learning outcomes
Abdominocentesis, diagnostic peritoneal lavage
Oesophageal and gastric endoscopy; foreign body retrieval
Gastric lavage and enema

Placement and management of peritoneal drainage devices

Urinary
Cystocentesis
Urethral catheterisation
Cystostomy tube placement
Placement of peritoneal dialysis catheter; peritoneal dialysis

Trauma management
Bandage/Splint/Cast placement for limb support
Closed reduction of luxated hip, elbow, shoulder
Wound debridement
Use of appropriate wound drainage techniques
Laceration repair
Management of head trauma

Anaesthesia and analgesia
Epidural anaesthesia/analgesia
Intercostal nerve block
Intrapleural analgesia
Intravenous regional anaesthesia
Balanced anaesthesia in the critical patient
Low flow/closed circuit anaesthesia
CRI analgesia
Transdermal analgesia
Intra-articular analgesia

Nutrition
Placement and management of nasogastric/naso-oesophageal, oesophagostomy and gastrostomy tubes
Management of jejunostomy tubes
Calculation/formulation of TEN, PPN, CPN

Ophthalmologic
Ophthalmic examination
Measurement of intraocular pressure
Third eyelid flap
Enucleation
Emergency tarsorrhaphy
Subconjunctival flap
Management of uveitis
Management of glaucoma

Diagnostic Procedures
Arterial and venous blood gas analysis
ACTH stimulation test
Activated clotting time measurement, APT, APTT
Buccal mucosal bleeding time
CSF tap
Blood culture collection

Bone marrow aspirate/biopsy
Arthrocentesis
Cytological evaluation of:
    Blood smears
    Abdominal/thoracic fluid

Fluid and transfusion therapy
Cross-matching
Blood typing
Whole blood collection
Set-up CRI administration of drugs
Blood component transfusion
Fluid challenge and interpretation
Low volume or hypotensive fluid resuscitation techniques

Imaging
Plain film radiographic procedures and interpretation
Horizontal beam radiography
Excretory Urography
Cystourethrogram
Myelogram
Barium swallow
Upper GI Barium series
Ultrasonographic detection of fluid in body cavities
Ultrasound guided aspirates

Appendix 4: Clinical Knowledge Checklist

The following list of topics is included as an indicator of the depth and breadth of subjects to be discussed during training either informally with the supervisor or in formal seminars. It is not an exclusive list and is an adjunct to, not a replacement for, directly supervised clinical and technical training.

A. Anatomy, Physiology, Pathology and Therapy of Systems Derangements

1. **Cardiovascular**
    a. Physiology
        i. Mechanical cardiac cycle
        ii. Determination of cardiac output: principles and techniques
            1. Wedge pressure measurements
            2. Lithium dilution
        iii. Cardiac muscle function
        iv. The action potential
        v. Autonomic regulation
    b. Circulation
        i. Local and systemic regulatory mechanisms
        ii. Special regions: cerebral, coronary, renal splanchnic
    c. Cardiac arrhythmias and conduction disturbances
        i. Mechanisms
        ii. Cardiac pacing
    d. Cardiac tamponade and other acute pericardial diseases
    e. Acute valvular disorders
    f. Heartworm disease
    g. Microvasculature including the glycocalyx
    h. Current concepts of Starling's Law
    i. DO2/VO2 concepts
    j. Recognition, evaluation and management of hypertension
        i. Regulatory mechanisms
        ii. Treatment
    k. ECG interpretation and application
    l. Blood pressure monitoring
    m. Auscultation
    n. CVP interpretation and application
    o. Pharmacology:
        i. Anti-arrhythmics
        ii. Inotropic agents
        iii. Vasoactive drugs
    p. Oxygen balance: delivery and uptake
    q. Primary myocardial disease
        i. Pathophysiology of CHF
        ii. Cardiomyopathy

iii. Myocarditis

r. Shock – hypovolaemic, distributive, cardiogenic, obstructive, metabolic

2. Respiratory

a. Physiology
   i. Properties of gases
   ii. Pulmonary volumes, Tidal volume measurement
   iii. Work of breathing
   iv. V/Q relationships
   v. Compliance
   vi. Control of breathing
   vii. Gas exchange

b. Lung anatomy
   i. Pulmonary circulation

c. Assessment of lung function
   i. Auscultation
   ii. Radiography
   iii. A-a gradient
   iv. CaO_2
   v. VO_2, DO_2
   vi. CO_2 transport
   vii. Blood gases
   viii. End tidal gases

d. Airway management
   i. Emergency airway management
   ii. Endotracheal intubation
   iii. Tracheostomy

e. Ventilatory support techniques
   i. Oxygen therapy
   ii. Oxygen toxicity
   iii. Mechanical ventilation
      1. Indications
      2. Modes
      3. Hazards
      4. Haemodynamic effects
      5. Weaning

f. ALI/ARDS
   i. Pathophysiology
   ii. Diagnostic criteria (human and veterinary)
   iii. Treatment

g. Smoke inhalation, airway burns

h. Drowning

i. Aspiration or chemical pneumonitis

j. Chest trauma

k. Upper airway obstruction
    i. Brachycephalic airway disease
    ii. Laryngeal paralysis
    iii. Foreign body, mass, oedema
l. Infectious respiratory diseases
m. Bronchial disease
n. Pulmonary hypertension
o. Pleural space disease
p. Chest wall disease
q. Diaphragm disease and injury
r. Vascular disease – PTE
s. Pulmonary oedema
    i. Cardiogenic
    ii. Non-cardiogenic
t. Acute respiratory failure
u. Pharmacology
    i. Diuretics
    ii. Bronchodilators; bronchoconstrictors

3. Gastrointestinal

a. Physiology
    i. Vascular supply to GI tract
    ii. Motility
    iii. Endothelial physiology
    iv. Hormonal factors
b. Role in shock
c. Upper GI bleeding
d. Lower GI bleeding
e. Acute pancreatitis
f. Megacolon
g. Acute abdomen
    i. Acute perforations of the GI tract
    ii. Acute inflammatory diseases of the intestine
    iii. Abdominal trauma, blunt and penetrating
    iv. Gastric dilations – torsion
h. Pancreas
    i. Physiology
    ii. Pancreatitis
    iii. Diabetes mellitus
    iv. Exocrine pancreatic insufficiency
i. Liver
    i. Physiology
        1. Metabolism: glucose
        2. Vascular

3. Hormonal

ii. Drug clearance mechanisms
iii. Acid-base balance
iv. Role in shock
v. Function in sepsis
vi. Acute hepatic failure
vii. Chronic hepatic failure
viii. Cirrhosis
ix. Hepatic encephalopathy
x. Ruptured/fractured liver
xi. Bile peritonitis
xii. Infectious diseases including leptospirosis, hepatic abscess and infectious cholecystitis, biliary mucocoele

j. Microbiology
k. Pharmacology
    i. Prokinetics
    ii. Ulcer treatment/prophylaxis
    iii. Anti-emetics
    iv. Antibiotics
    v. Coagulation support

4. Urinary

a. Physiology
    i. Circulation
    ii. GFR
    iii. Tubular function
b. Renal regulation of fluid balance and electrolytes
    i. Fluid balance
    ii. Sodium and potassium balance
    iii. Derangements secondary to alterations in osmolality and electrolytes
    iv. Acid-base derangements
c. Renal failure:
    i. Oliguria
    ii. AKI - pathophysiology and treatment
    iii. CKD – factors and response
    iv. Prerenal, renal, postrenal
d. Dialysis
    i. Peritoneal
    ii. Haemodialysis
    iii. Continuous renal replacement therapy
e. Urinary tract obstruction
f. Drug clearance
g. Role of lower tract in barrier protection
h. Control of micturition

i. Pharmacology

5. **Reproductive Disorders**
    a. Eclampsia
    b. Dystocia
    c. Prostatic abscess
    d. Prostatitis
    e. Paraphimosis
    f. Penile trauma
    g. Orchitis/testicular torsion
    h. Pyometra, metritis
    i. Mastitis
    j. Postpartum haemorrhage
    k. Neonates

6. **Metabolic/Endocrine**
    a. Disorders of thyroid function
    b. Disorders of pituitary function
    c. Disorders of adrenal gland function
    d. RAAS
    e. Glucose metabolism
        i. Diabetes mellitus
        ii. Hyperosmolar hyperglycaemic crisis
        iii. Ketoacidosis
        iv. Hypoglycaemia
        v. Insulinoma
    f. Disorders of calcium balance/parathyroid disease
    g. Disorders of magnesium balance

7. **Nutrition**
    a. Evaluation of requirements
        i. Essential components of nutrition
        ii. Nutritional requirements in critical illness
    b. Metabolism of carbohydrates, fat protein
    c. Starvation
        i. Simple
        ii. Stress
    d. Feeding options and techniques
        i. Enteral
        ii. Parenteral
    e. Complications of feeding
        i. Metabolic including refeeding syndrome
        ii. Mechanical

8. **Haemo-lymphatic**
    a. Acute defects in haemostasis
        i. Haemostasis in inflammation and sepsis
        ii. Hypercoagulable states
    b. The roles of the endothelium:
        i. Coagulation
        ii. Inflammation
        iii. Vascular tone
    c. Anaemia
    d. Thrombocytopenia
    e. Neutropenia
    f. Disseminated intravascular coagulation
    g. Toxic coagulopathies
    h. Hyperfibrinolysis syndrome
    i. Mechanism of immune-mediated disease: haemolytic anaemia, thrombocytopenia
    j. Anaphylaxis

9. **Infectious Diseases**
    a. Infectious diseases and management including prophylaxis
        i. Mechanisms of disease – host response
        ii. Sites of entry
    b. Antibiotics
        i. MOA
        ii. Indications
        iii. Spectrum of activity
        iv. Adverse effects
    c. Bacterial resistance
        i. Mechanisms
        ii. Strategies to decrease
    d. Antifungals,
    e. Antiviral
    f. Microbiology:
        i. Fungi
        ii. Yeasts
        iii. Gram +ve and –ve bacteria
        iv. Aerobic and Anaerobic infections
        v. Viruses
    g. Nosocomial infections

10. Neurologic

a. The brain:
    i. Circulation
        1. Anatomy
        2. Blood brain barrier
        3. Regulation of cerebral perfusion
    ii. CSF dynamics
    iii. Intracranial pressure
    iv. EEG
    v. Clinical evaluation of activity level
        1. Modified Glasgow Coma Score
    vi. Metabolism and energy requirements
    vii. Trauma:
        1. Pathophysiology of primary brain injury
        2. Pathophysiology of secondary brain injury
        3. Treatment
    viii. Infectious diseases
    ix. Mass lesions
    x. Drug ingestion
    xi. Seizures
        1. Aetiology
        2. Treatment

b. Spinal cord
    i. Response to injury
    ii. Mechanisms of neural transmission
    iii. Pain modulation

c. Idiopathic vestibular syndrome

d. Peripheral NS
    i. Nerve excitation and conduction
        1. Synaptic transmission
        2. Reflexes
    ii. Neural injury
    iii. Pain, the transmission of pain
    iv. Neuromuscular disease
        1. Guillian Barre,
        2. Polyradiculoneuritis
        3. Tick paralysis
        4. Snake envenomation
        5. Botulism
        6. Myasthenia gravis
    v. Electrodiagnostics

11. Musculoskeletal

a. Skeletal and smooth muscle contraction
b. Initial management of closed and open fractures
c. Crush injury
d. Tendon repair

12. Oculo-Otic

a. Management and/or repair of ocular problems anterior to the iris
    i. Corneal ulcer
    ii. Eyelid laceration
    iii. Corneal laceration
    iv. Hyphaema
    v. Horner's syndrome
    vi. Acute glaucoma
b. Management and/or repair of acute otic conditions
    i. Otitis media
    ii. Foreign body

13. Wound management

a. Skin trauma
b. Principles of wound management
c. Burns
d. Open fractures

14. Coagulation/Transfusion Medicine

a. Normal coagulation (both traditional and cell based model)
b. Interplay between inflammation and coagulation
c. Laboratory testing including TEG, ROTEM, platelet function tests
d. Haemoglobin physiology
e. Platelet function
f. Coagulopathies
    i. DIC
    ii. Thrombocytopenia/pathia
    iii. Factor deficiencies
g. Endogenous anticoagulants
h. Procoagulant therapy
i. Anticoagulant therapies
j. Thrombolytic therapy
k. Transfusion practices
l. Artificial haemoglobin solutions

15. Prehospital/Admission – Triage

a. Facility set up
b. Organisation
c. Emergency drugs/supplies
d. Primary telephone contact
e. Client communication
f. Hospital transport
g. Primary survey
h. Secondary survey

16. Resuscitation

a. Airway
b. Breathing
c. Control of acute bleeding/blood loss
d. Cardiovascular support
e. Vascular access techniques
f. Fluids
g. Emergency drugs
h. Monitoring
i. Thermal support

17. Primary Support Techniques

a. Fluids
b. Oxygen administration techniques and flow rates
c. Cardiac support
    i. Inotropic drugs
    ii. Vasoactive agents
    iii. Antiarrhythmics

18. Toxins:

a. Principles of treatment: supportive care, decontamination, antidotes
b. MOA, clinical signs, treatment
c. Specific toxins (Non-exclusive):
    i. Plants: lily, cycads,
    ii. Snail baits: metaldehyde, methiocarb, iron
    iii. Insecticides: ivermectin, avermectins, pyrethroids
    iv. Organophosphate toxicities: acute, chronic, intermediate
    v. Strychnine
    vi. 1080
    vii. PAPP: Para-aminopropiophenone
    viii. Heavy metal: Lead, zinc
    ix. Envenomations: snake, tick, toad, tetrodotoxin, lactrodectes
    x. Drugs: serotonin syndrome, illicit drugs, non-steroidal anti-inflammatories, paracetamol

xi. Household poisons
xii. Gaseous: CO
xiii. Food: Chocolate, raisins/grapes, macadamia nuts, xylitol, onions
xiv. Rodenticides: anticoagulant, cholecalciferol

19. Pharmacology

Candidates should be familiar with the dose, indications, contraindications and drug interactions of drugs used in the management of the emergency and critically ill patient. The following list is intended to give a broad view of the categories of drugs that maybe covered. Specific drugs have not been listed.

1. Pharmacokinetics and factors in efficacy
2. Antibiotics
   2.1. MOA
   2.2. Spectrum
   2.3. Antibiotics of preference for certain organisms/locations
3. Antifungals
4. Antiviral
5. Antineoplastics
6. Metabolic/endocrine
   6.1. Corticosteroids
   6.2. Insulin
   6.3. Thyroid hormones
7. Ophthalmologic drugs
8. Anti-inflammatory
   8.1. NSAID
   8.2. Corticosteroids
9. Immunosuppressive
10. Fluids/colloids
11. Cardiovascular medications
    11.1. Inotropic agents
    11.2. Vasopressors
    11.3. Vasodilators
    11.4. Diuretics
    11.5. Antiarrhythmics
12. Respiratory medications
13. GI medications
    13.1. Prokinetics
    13.2. Antiemetics
    13.3. Anti-ulcer medications
14. Hepatic medications
15. Renal medications
    15.1. Consequences of reduced renal function on drugs used in therapy
16. CNS medications
    16.1. Mannitol

16.2. Anticonvulsants
16.3. Sedatives – hypnotics
16.4. Tranquillisers
16.5. Anaesthetics
17. Analgesics
18. Neuromuscular blockers

20. Fluid balance/therapy

a. Physiology
    i. Cell membrane integrity
    ii. Cell membrane pumps/transport mechanisms
    iii. Osmolality
    iv. Oncotic pressure
b. Crystalloids
c. Colloids
d. Acid-base physiology/pathophysiology
e. Electrolytes
f. Glycocalyx

21. Oncologic emergencies

a. Pre-treatment
b. Post-treatment

22. Surgery

a. Materials and suture patterns
b. Principles of asepsis
c. Surgical approaches to the chest, including:
    i. Lung lobectomy
    ii. Open-chest CPR
    iii. Closure of the thoracic cavity
d. Surgical approaches to the abdomen, including:
    i. Exploratory laparotomy
    ii. Open abdomen
    iii. GDV
    iv. Gastrectomy
    v. Caesarian
    vi. Enterotomy/enterectomy
    vii. Pyometra ovariohysterectomy
    viii. Diaphragmatic hernia
    ix. Splenectomy
    x. Liver lobectomy
    xi. Cystotomy

B. Management of Global Problems

There are some emergency and critical care conditions that do not fit easily into any body systems category. The pathophysiology, diagnosis and treatment of these conditions is within the scope of this examination. The conditions include:

1. Hypothermia
2. Heat stroke/thermal injury
3. Fever of unknown origin
    a. Approach
    b. Pathophysiology
4. Shock
5. Sepsis/SIRS
    a. Endothelial physiology
    b. Inflammatory mediators
    c. Coagulation
        i. Platelets
        ii. Disseminated intravascular coagulation
        iii. Pro-coagulant changes
6. Multiple Organ Dysfunction
7. Cardiopulmonary arrest
    a. RECOVER Guidelines 2024
8. Trauma: Initial approach to the management of multisystem trauma.

C. Assessment of the Emergency and ICU Patient

Candidates should be able to prioritise a patient's problems based upon principles of triage. Assessment includes usage of history, physical examination findings, clinical pathology, radiology/ultrasound and electrocardiograms and scoring systems where relevant i.e. modified Glasgow coma scale, acute patient physiological and laboratory (APPLE), animal trauma triage scoring systems.

D. Diagnostics and monitoring

1. Haemogram or components thereof
2. Chemistry profile or components thereof
3. Electrolytes
4. Blood gases
5. Continuous Glucose Monitors
6. Urine analysis
7. Coagulation profiles – ACT, PT, APTT, platelet counts, fibrinogen, D-dimers
8. Radiography/contrast procedures
9. Ultrasound
10. Electrocardiogram and Echocardiography
11. Colour flow Doppler
12. Cardiac catheterisation

E. Management of Anaesthesia and Analgesia

Candidates should be familiar with the principles of anaesthesia and analgesia as they apply to the emergency or critically ill patient. It is necessary to understand the concepts of balanced anaesthesia, use of opioids and management of anaesthetic emergencies.

Appendix 5 – Template for Recording of Teaching Requirements

Fellowship Candidate Name: Subject: Veterinary Emergency Medicine and Critical Care Date of Submission:

Formal Lectures				
Date	Title/Topic	Location	Length	Role of Candidate

Laboratory/Clinical Teaching				
Date	Title/Topic	Location	Length	Role of Candidate

Appendix 6 – Template for Recording of Seminars

Fellowship Candidate Name: Subject: Veterinary Emergency Medicine and Critical Care Date of Submission:

Date	Title/Topic	Location	Type of Activity	Specialist in Attendance	Length (h)
Example: 9/8/2019	Intravenous lipid therapy for toxicities	Best Vet Hospital	Journal Club	Mary Jane (FANZCVS ECC)	1.5
			Subtotal for Page		1.5
			Total Seminar Hours		1.5