



**AUSTRALIAN AND NEW ZEALAND  
COLLEGE OF VETERINARY SCIENTISTS**

**FELLOWSHIP GUIDELINES**

***Animal Reproduction (Theriogenology)***

**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 of the College in Animal Reproduction, or Diplomate status of the American College of Theriogenologists and/or the European College of Animal Reproduction must be achieved prior to the Fellowship examination.

**OBJECTIVES**

To demonstrate that the candidate has sufficient training, experience, knowledge and accomplishment in Animal Reproduction (Theriogenology) to meet the criteria for registration as a specialist in this field.

**LEARNING OUTCOMES**

The candidate will have sufficient training, knowledge and experience in Animal Reproduction to entitle him/her to be acknowledged by colleagues as a specialist in this area.

1. The candidate will be expected to have:
  - 1.1. A **detailed**<sup>1</sup> knowledge of the normal anatomy, physiology, embryology and immunology of the reproductive systems and associated structures in the dog, cat, horse, ruminants and pig.
  - 1.2. A **detailed** knowledge of the aetiology, pathogenesis and pathophysiology of reproductive dysfunction in the dog, cat, horse, ruminants and pig, both individually and in a herd situation.

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<sup>1</sup> 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 major literature.

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- 1.3. A **detailed** knowledge of the diagnostic tests and procedures as these apply to the diagnosis of reproductive function and dysfunction and the ability to apply this knowledge with complete competence in the clinical situation.
  - 1.4. A **detailed** knowledge of the treatment and prevention of reproductive dysfunction in the dog, cat, horse, ruminants and pig including a detailed knowledge of the principles and application of reproductive pharmacology, therapeutics, medicine and surgery of the reproductive system and associated structures.
  - 1.5. A **detailed** knowledge of comparative pathology of the reproductive system in the dog, cat, horse, ruminants and pig.
  - 1.6. A **detailed** knowledge of systemic influences on reproductive function. (These include, but are not limited to: toxins, endocrine disruptors, inflammation (such as endometritis, lameness and mastitis), stressors (such as heat and nutritional) and systemic infectious agents.)
  - 1.7. A **detailed** knowledge of the common assisted reproductive techniques (ART's) in the dog, cat, horse, ruminants and pig.
  - 1.8. A **detailed** knowledge of the current literature so as to enable a critique of processes and procedures in the dog, cat, horse, ruminants and pig theriogenology.
  - 1.9. A **detailed** knowledge of current concepts, including surgical and medical techniques, of contraception, with their potential application to the dog, cat, horse, ruminants and pig.
  - 1.10. A **detailed** knowledge of infectious organisms which both directly and indirectly affect reproductive performance in the dog, cat, horse, ruminants and pig, both individually and in a herd situation
  - 1.11. A **detailed** knowledge of normal and abnormal reproductive behaviour in the dog, cat, horse, ruminants and pig.
  - 1.12. A **detailed** knowledge of applied clinical pharmacology and therapeutics in reproductive management in the dog, cat, horse, ruminants and pig.
  - 1.13. A **sound** knowledge of less common ARTs (such as intra-cytoplasmic sperm injection (ICSI), and ART's applicable to less common species- camelids, birds and fish.
  - 1.14. A **sound** knowledge of reproductive diseases of the dog, cat, horse, ruminants and pig which are exotic to Australia and New Zealand.
  - 1.15. A **sound** knowledge of the exotic infectious diseases of the dog, cat, horse, ruminants and pig which could be introduced into Australia and New Zealand especially as a result of techniques used in reproduction.
  - 1.16. A **sound** knowledge of reproduction in camelids.
  - 1.17. A **sound** knowledge of epidemiological principles and their application to disease control programs in reproductive medicine.
  - 1.18. A **sound** knowledge of heritable diseases, and genetics in the dog, cat, horse, ruminants and pig.
  - 1.19. A **basic** knowledge of reproductive function and dysfunction in small mammals ('pocket pets'), birds and fish.
2. The candidate will be expected to be able:

- 2.1. With **detailed**<sup>2</sup> expertise perform a reproductive clinical examination of the dog, cat, horse, ruminants and pig. These procedures include, but are not limited to, per rectum palpation, digital examination, vaginoscopy, hysteroscopy, cytology, and biopsy of the pregnant and non-pregnant animal where appropriate.
- 2.2. With **detailed** expertise undertake artificial insemination in at least three animal species.
- 2.3. With **sound** expertise undertake appropriate surgical procedures such as neutering in various species, and caesarean in the cow and/or the bitch.

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<sup>2</sup> **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.

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## 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 (three hours)
2. **Written Paper 2** (*Component 2*)  
Applied Aspects of the Subject (three hours)
3. **Practical Examination** (*Component 3*)  
Practical (two hours)
4. **Oral Examination** (*Component 4*)  
Oral (two hours)

The written examinations will comprise of two separate three-hour written papers taken on two consecutive days. There will be an additional 20 minutes perusal time for each paper, during which no writing in an answer booklet is permitted. In each paper you are provided with six (6) questions to answer, each worth 30 marks (one of these will be 10 multiple choice questions worth 3 marks each), giving a total of 180 marks per paper. There is no choice of questions. Questions may be long essay type, a series of shorter answer sub-questions, or multiple-choice questions. Marks allocated to each question and to each subsection of questions will be clearly indicated on the written paper.

### **Written Paper 1:**

This paper is designed to test the candidate's knowledge of the principles of the subject 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 the subject to particular cases, problems or tasks and b) test the candidate's familiarity with current practices and issues that arise from activities within the discipline in Australia and New Zealand. Where clinical pathology results are presented, normal ranges will be provided.

**Calculators** may be used during the examination.

### **Practical Examination:**

The practical examination is designed to test practical aspects of the Learning Outcomes. Candidates will be required to compose written answers pertaining to the interpretation and management of case-based material presented. Case material may include pathology slides, clinical pathology results, radiographs, images and videos. Candidates must demonstrate deep understanding and practical application of procedures, equipment and diagnostic tests used in Animal Reproduction. No perusal time will be given for the practical exam. The practical will consist of a series of ten (10) questions with sub-questions, equating to a total of 120 marks. Marks allocated to each question and to each sub-section will be clearly indicated on the written paper.

### **Oral Examination:**

The oral examination is designed to test practical aspects of the Learning Outcomes. Candidates will be asked to discuss case presentations in detail. Six (6) cases are presented with supporting material and questions asked verbally in a face-to-face setting. The oral examination has a total of 120 marks. Images, radiographs, ultrasound images and clinical pathology results are likely to be used during this examination.

### **TRAINING PROGRAMS**

Refer to the *Fellowship Candidate Handbook*: <https://www.anzcvs.org.au/fellowship/> Section 2 for Fellowship Training.

Section 3 for Submission of a Training Program Document.

Maintenance of Cumulative Activity Log Summary. (Section 2.8 and 2.9.)

In addition to the *Fellowship Candidate Handbook* stipulations:

1. The program should provide the candidate exposure to dog, cat, horse, ruminants and pig cases; as well as exposure to camelids, pocket pets, birds and fish so that at least 25 hours per week are spent carrying out theriogenology clinical work to meet the learning outcomes.
2. The candidate is expected to acquire a high degree of clinical competence in performing and interpreting all aspects of any detailed reproductive investigation in the dog, cat, horse, ruminants and pig.
3. The candidate must be exposed to a sufficient number and variety of reproductive cases in domestic species to acquire clinical proficiency in the treatment/management of a wide range of conditions with a thorough understanding of relevant clinical pharmacology. There must also be sufficient exposure to hospitalised cases to enable the candidate to acquire proficiency in the intensive care required by such cases.
4. The candidate should be actively involved in patient-oriented teaching rounds, which includes presenting at regular teaching seminars, journal and text reviews. The candidate should present at least 6 clinical cases to their peers; and critically review and present at least four journal articles to peers. Clinically relevant didactic lectures and continuing education conferences should be attended where appropriate. Participation in regional, state, national and international meetings is encouraged.
5. The candidate must make at least one presentation at a national or international scientific meeting during the training program.

### **TRAINING IN RELATED DISCIPLINES**

Refer to the *Fellowship Candidate Handbook*, 2.4.2.

Candidates for Fellowship in Animal Reproduction (Theriogenology) must spend time as stipulated by the *Fellowship Candidate Handbook* in any or all of the following related disciplines in domestic species (dogs, cats, horses, ruminants and pigs): diagnostic imaging, medicine, surgery, anaesthesia, anatomic (gross) pathology, clinical pathology, and pharmacology and therapeutics.

## EXTERNSHIPS

Refer to the *Fellowship Candidate Handbook*, Section 2.4.1.

### ACTIVITY LOG SUMMARY

The Activity Log Summary (ALS) should be kept in the format of that found on the college web site: <http://www.anzcvb.org.au/fellowship/fellowship-forms/>

The candidate should utilise the forms and modify them appropriately to suit the cases they have attended.

### CASE MINIMA

CATEGORY	Minimum NUMBER*
Female breeding fitness evaluation	30**
Male breeding fitness assessment: including semen evaluation.	30**
Female cycle assessment or fertility examination	100**
Artificial insemination	100**
Embryo transfer	20*
Pregnancy diagnosis	100**
Dystocia/Abortion	30**
Periparturient neonatology	10*
Female periparturient disorders	30*
Semen analysis/morphological assessment	20*
Semen processing/preservation	20*
Female reproductive surgery excluding caesareans	10
Male reproductive surgery, including castration	20*
Caesarean and/or fetotomy	10
Pocket pets, fish, birds etc.	10
Reproductive herd health visits (production animal)	10

No. of cases:

\*\* implies: This must include at least three species, with a minimum of 5 cases per species

\* implies: This must include at least two species and minimum of 5 cases per species

## PUBLICATIONS AND PRESENTATION

Refer to the *Fellowship Candidate Handbook*, Section 2.10

### RECOMMENDED READING LIST

The candidate is expected to research the depth and breadth of the knowledge of the discipline. These lists are intended to guide the candidate to some core references and source material which represent a sound foundation for selective reading of information relevant to the discipline. Many recommended texts below cover similar material and the candidate, in consultation with his/her supervisors and mentor(s), should select appropriate material from these lists and other sources. The lists are not comprehensive and are not intended as an indicator of the content of the examination. The study of core texts and journals should be supplemented by study of other material to ensure an adequate knowledge of relevant applied and basic sciences and current literature. If uncertain of the breadth of reading required, the candidate should consult with their supervisor or mentor, or contact the Chief Examiner.

#### TEXTBOOKS

##### CORE<sup>3</sup>

Senger, P.L. (2012). *Pathways to Pregnancy and Parturition*. (3rd ed.). Current Conceptions Inc., Seattle.

Hopper, R. (2014). *Bovine Reproduction*. Wiley-Blackwell.

Youngquist, R. S., & Threlfall, W. R. (Eds.). (2007). *Current therapy in large animal theriogenology* (2nd ed.). St Louis, MO: Saunders Elsevier.

Johnston, S. D., Kustritz, M. V. R., & Olson, P. S. (2001). *Canine and feline theriogenology*. Philadelphia, PA: Saunders.

McKinnon, A. O., Squires, E. L., Vaala, W. E., & Varner, D. D. (Eds.). (2011). *Equine reproduction* (2nd ed.). Oxford, UK: Wiley-Blackwell.

#### RECOMMENDED

Chenoweth, P., Lorton, S. (2014). *Animal Andrology Theories and Applications*.

[www.cabi.org](http://www.cabi.org)

Barth, A.D., Oko, R.J. (1989). *Abnormal Morphology of Bovine Spermatozoa*. Iowa State University Press, Ames

Noakes, D.E., Parkinson, T.J., England, G.C. (2009). *Veterinary Reproduction & Obstetrics*. Saunders.

Lopate, C. (2012). *Management of Pregnancy and Neonatal Dogs, Cats and Exotics Pets*. Wiley-Blackwell.

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<sup>3</sup> **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.

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Cebra, C., Anderson, D., Tibary, A., Van Saun, R., Johnson, L. (2013). *Llama and Alpaca Care: Medicine, Surgery, Reproduction, Nutrition, and Herd Health*. Elsevier.

Maxie, M.G. (Ed.). (2016). *Jubb, Kennedy and Palmer's Pathology of Domestic Animals* (6th ed.). St. Louis, Missouri: Elsevier.

Small Animal Theriogenology. 2012. *Veterinary Clinics of North America*. 42, 3. Pp 423-614.

#### **CORE JOURNALS<sup>4</sup>**

*Theriogenology*

*Animal Reproduction Science*

*Reproduction* (<http://www.reproduction-online.org> )

*Clinical Theriogenology* (<http://www.st.omnibooksonline.com> )

Additional Journals Additional

*Equine Veterinary Journal*

*Equine Veterinary Education*

*Journal of Veterinary Internal Medicine*

*Journal of the American Veterinary Medical Association*

*American Journal of Veterinary Research*

*Veterinary Clinics of North America*

*Compendium of Continuing Education for the Practicing Veterinarian*

*Proceedings of the American Association of Equine Practitioners*

*Australian Veterinary Journal*

*Australian Equine Veterinarian*

*Veterinary Record*

*New Zealand Veterinary Journal*

*Research in Veterinary Science*

#### **PROCEEDINGS**

Proceedings of the Society for Theriogenology

#### **USEFUL WEB SITES**

Library of reproduction images, LORI: <http://lorimainsection.blogspot.com.au/>

The Drost Project: [www.drostproject.org](http://www.drostproject.org)

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<sup>4</sup> **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.

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## **FURTHER INFORMATION**

For further information contact the College Office

Telephone: International +61 (07) 3423 2016

Email: [examinations@anzcvs.org.au](mailto:examinations@anzcvs.org.au)

Web: [www.anzcvs.org.au](http://www.anzcvs.org.au)

Postal Address: Building 3, Garden City Office Park, 2404 Logan Road  
EIGHT MILE PLAINS QLD 4113 Australia

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**APPENDIX 1: ACTIVITY LOG SUMMARY (By System)**

**TEMPLATE: Animal Reproduction (Theriogenology)**

Refer to the Subject Guidelines for the appropriate Category listing. The following categories are examples only.

**NAME:**

**SUBJECT:**

**DATE:**

**Number of Cases**

CATEGORY	JAN		FEB		MAR		APR		MAY		JUNE		JULY		AUG		SEPT		OCT		NOV		DEC		Current TOTAL	Previous TOTAL	Cumulative TOTAL
<b>Dystocia:</b>	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S			
Small animal																											
Horse																											
Ruminant (specify)																											
Pig																											
Other (specify)																											
Total all species																											
<b>Neonatology:</b>																											
Small animal																											
Horse																											
Ruminant (specify)																											
Pig																											
Other (specify)																											
Total all species																											
<b>Periparturient disorder:</b>																											
Small animal																											
Horse																											
Ruminant (specify)																											
Pig																											
Other (specify)																											
Total all species																											
<b>Small mammal, fish, bird etc.</b>																											
<b>Reproductive herd health visits</b>																											
Previous TOTAL																											
<b>Cumulative TOTAL</b>																											

P = primary clinician, S= secondary clinician



**Embryo transfer:**

Small animal

Horse

Ruminant (specify)

Pig

Other (specify)

Total all species

**Pregnancy diagnosis:**

Small animal

Horse

Ruminant (specify)

Pig

Other (specify)

Total all species

**Semen morphology  
assessment:**

Small animal

Horse

Ruminant (specify)

Pig

Other (specify)

Total all species

**Semen processing:**

Small animal

Horse

Ruminant (specify)

Pig

Other (specify)

Total all species

Current TOTAL

**Non-caesarean female  
reproductive surgery:**

Small animal

Horse

Ruminant (specify)

Pig

Other (specify)

Total all species

<b>Male reproductive surgery (including castration):</b>																												
Small animal																												
Horse																												
Ruminant (specify)																												
Pig																												
Other (specify)																												
Total all species																												
<b>Caesarean and/or fetotomy:</b>																												
Small animal																												
Horse																												
Ruminant (specify)																												
Pig																												
Other (specify)																												
Total all species																												
Previous TOTAL																												
<b>Cumulative TOTAL</b>																												

**P = primary clinician, S= secondary clinician**