



AUSTRALIAN AND NEW ZEALAND COLLEGE OF VETERINARY SCIENTISTS

MEMBERSHIP GUIDELINES

Medicine of Zoo Animals

INTRODUCTION

These Membership Guidelines should be read in conjunction with the *Membership Candidate Handbook*.

ELIGIBILITY

Refer to Section 2 of the *Membership Candidate Handbook*.

OBJECTIVES

To demonstrate that the candidate has sufficient knowledge of, and experience in, the veterinary care and management of zoo animals to be able to give sound advice in this field to veterinary colleagues.

LEARNING OUTCOMES

For the purposes of this document 'Zoo Animals' is defined as mammals, birds, reptiles, amphibians and fish, with an emphasis on those species commonly encountered in zoos in Australia and New Zealand. Invertebrate medicine will not be examined.

1. The candidate will have a **sound¹ knowledge** of:
 - 1.1. the biology of commonly held zoo animals including taxonomy, phylogenetic groupings, natural distribution, habitat, diet, reproduction, and population dynamics

¹Knowledge 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

- 1.2. the comparative anatomy and physiology of commonly held zoo animals
 - 1.3. the captive husbandry and management of zoo animals with particular reference to the maintenance of health and welfare, including nutrition, reproductive and genetic management, hygiene, handling, enclosure and housing design, behaviour and record keeping
 - 1.4. preventative medicine including nutrition, quarantine, parasite surveillance and control, vaccination, and pest control
 - 1.5. common diseases of zoo animals, including aetiology, pathogenesis, epidemiology, clinical signs, diagnosis, treatment, control and prevention
 - 1.6. significant diseases in zoo species exotic to Australia and New Zealand, and the quarantine requirements for import of zoo species into either Australia or New Zealand
 - 1.7. available forms of restraint for zoo animals, and their relative merits; including behavioural, physical and chemical methods, including the use of neuroleptic drugs. The candidate should be familiar with remote drug delivery systems.
 - 1.8. the pharmacology of drugs commonly used in zoo animals including those used for anaesthesia and sedation
 - 1.9. clinical and gross pathology of common diseases of zoo animals, including diagnostic necropsy techniques
 - 1.10. zoonotic diseases, especially those associated with non-domestic animals, including their diagnosis, treatment, control and prevention
2. The candidate will have a **basic knowledge** of:
 - 2.1. principles and practice of disease outbreak investigations and disease risk analysis
 - 2.2. the role of zoos in conservation, including an understanding of endangered species breeding programs and recovery teams, the principles of wildlife management and wildlife legislation relating to captive management, transport and welfare
 3. The candidate will be able to do the following technical procedures:
 - 3.1. with **sound**² expertise:
 - 3.1.1. full physical exam appropriate to species in question

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.

- 3.1.2. anaesthesia or sedation, following best accepted practice
 - 3.1.3. collect diagnostic samples: including blood, crop and gastric lavage, body cavity centesis, using best accepted methodology
 - 3.1.4. common surgical procedures, involving both soft tissue and orthopaedics
 - 3.1.5. administer therapeutics, following best accepted practice for choice of agent, doses, rates and method of delivery
 - 3.1.6. safe and effective use of remote drug delivery systems
 - 3.1.7. collect, interpret and record clinical and associated data for both individuals and groups of zoo species, including:
 - 3.1.7.1. historical and environmental information
 - 3.1.7.2. physical examination of all body systems
 - 3.1.7.3. appropriate choice of diagnostic tests
 - 3.1.7.4. interpretation of reported haematology and biochemistry results
 - 3.1.8. recognise and interpret haematological and cytological preparations from commonly encountered species
 - 3.1.9. interpretation of serological results for commonly encountered diseases
 - 3.1.10. diagnostic imaging, including appropriate positioning and views and interpretation of common radiologic and ultrasonographic findings in the zoological setting
 - 3.1.11. analyse commonly encountered problems of zoo species and make sound clinical judgements
 - 3.1.12. communicate effectively and empathetically with keepers, other zoo staff and members of the public
- 3.2. with a **basic** level of expertise:
- 3.2.1. identification, including gender and age determination, of commonly encountered species
 - 3.2.2. physical restraint, following best accepted practice
 - 3.2.3. provision of short term housing, including appropriate nutrition
 - 3.2.4. transportation of common species, including appropriate choice of holding crate, preparation etc.

EXAMINATIONS

For information on the required standard and format for both the Written and Oral examinations, candidates are referred to Sections 3, 10 and 11 of the *Membership Candidate Handbook*. The Membership examination has **two separate, components**:

1. **Written Examination** (*Component 1*)

Written Paper 1 (two hours): Medicine of Zoo Animals Principles

Written Paper 2 (two hours): Application of Medicine of Zoo Animals principles

2. **Oral Examination** (*Component 2*)

Oral (approximately forty-five minutes)

The written examination will comprise of two separate two-hour written papers taken on the same day. There will be an additional 15 minutes perusal time for each paper, during which no writing in an answer booklet is permitted. In each paper you are provided with four (4) questions to answer, worth 30 marks each, giving a total of 120 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 Medicine of Zoo Animals as described in the Learning Outcomes. Where questions relate to general principles, answers may cite specific examples, but should primarily demonstrate an understanding of the underlying theoretical basis.

Written Paper 2:

This paper is designed to (a) test the candidate's ability to apply the principles of Medicine of Zoo Animals to particular cases/problems or tasks and (b) test the candidate's familiarity with the current practices and issues within the discipline of Medicine of Zoo Animals in Australia and New Zealand.

Oral Examination:

This examination requires the candidate to demonstrate achievement of the above-mentioned Learning Outcomes, through the discussion of case material. Five (5) principal questions are presented with additional supporting questions asked verbally in a face-to-face setting. The oral examination has a total of 100 marks with each case allocated 20 marks. The duration of this examination is approximately forty-five (45) minutes. Questions will be in the form of both short answers and more extended discussions that may include, but are not limited to case management, techniques and procedures, interpretation of diagnostic findings and species identification. Questions may have supporting images or information that the candidate will be required to interpret.

RECOMMENDED READING MATERIAL

The candidate is expected to read widely within the discipline, from editions listed or later, paying particular attention to areas not part of their normal work experiences. This list of books and journals is intended to guide the candidate to some core references and other source material. Candidates also should be guided by their mentors. *The list is not comprehensive and is not intended as an indicator of the content of the examination.*

Vogelnest L, Woods R. *Medicine of Australian Mammals*, CSIRO Publishing, 2008.

Fowler ME, Miller RE. *Zoo and Wild Animal Medicine*. 5th, 6th, 7th and 8th editions. Saunders, 1999, 2003, 2008, 2012, 2015.

Harrison GJ, Lightfoot TL. *Clinical Avian Medicine, Vol I & II*. Spix Publishing, 2006.

Mader D. *Reptile Medicine and Surgery*. 2nd edition. Saunders, 2006.

West G, Heard D, Caulkett N. *Zoo Animal and Wildlife Immobilization and Anesthesia*. 2nd edition. Wiley-Blackwell, 2014.

OTHER USEFUL REFERENCES

Journals

Australian Veterinary Journal

Journal of Avian Medicine and Surgery (formerly Journal of the AAV)

Journal of Herpetological Medicine and Surgery (formerly Bull ARAV)

Journal of Wildlife Diseases

Journal of Zoo and Wildlife Medicine

New Zealand Veterinary Journal

General texts

Fowler ME. *Restraint and Handling of Wild and Domestic Mammals*. 3rd edition. Wiley-Blackwell, 2008.

Ladds P. *Pathology of Australian Wildlife*. CSIRO Publishing, 2009

Asa CS, Porton IJ. *Wildlife Contraception*. The John Hopkins University Press, 2005.

Jakob-Hoff R.M., MacDiarmid S.C., Lees C., Miller P.S., Travis D. & Kock R. (2014). – *Manual of Procedures for Wildlife Disease Risk Analysis*. World Organisation for Animal Health, Paris, 160 pp. Published in association with the International Union for Conservation of Nature and the Species Survival Commission.

Exotic Mammals

Williams ES, Barker IK. *Infectious Diseases of Wild Mammals*. 3rd edition. Iowa State University Press, 2001.

Fowler ME, Mikolts SK. *Biology, Medicine and Surgery of Elephants*. Blackwell Publishing, 2006.

Dierauf LA, Gulland FMD. *CRC handbook of Marine Mammal Medicine*. 2nd edition. CRC Press 2001.

Australian Mammals

Vogelneust L, Allen G. *Radiology of Australian Mammals*, CSIRO Publishing, 2015.

Van Dyck S, Strahan R. *The Mammals of Australia*. 3rd edition. Australian Museum 2008.

Jackson S. *Australian Mammals: Biology & Captive Management*. CSIRO Publishing, 2003.

Hume ID. *Marsupial Nutrition*. Cambridge University Press, 1999.

Clark P. *Haematology of Australian Mammals*. CSIRO Publishing, 2004.

Wildlife, Proceedings 371. Postgraduate Committee in Vet Science, 2008.

Birds

Campbell TW and Ellis CK, *Avian and Exotic Animal Hematology and Cytology*. 3rd edition. Wiley Blackwell, 2007.

Doneley B. *Avian Medicine and Surgery in Practice*. Manson Publishing, 2011.

Ritchie BW, Harrison GJ, Harrison LR. *Avian Medicine: Principles & Application*, Wingers Publishing, 1994

Rupley EA. *Manual of Avian Practice*. Saunders, 1997.

Thomas NJ, Hunter DB, Atkinson CT. *Infectious Diseases of Wild Birds*. Blackwell Publishing, 2007.

Reptiles and Amphibians

Wright KM, Whitaker BR. *Amphibian medicine and captive husbandry*. Krieger, 2001.

Mader DR, Divers S. *Current Therapy in Reptile Medicine and Surgery*. Elsevier Inc., 2014.

Jacobson ER. *Infectious Diseases and Pathology of Reptiles: Color Atlas and Text*. CRC, 2007.

Girling SJ, Raiti P. *BSAVA Manual of Reptiles*. 2nd edition. British Small Animal Veterinary Association, 2004.

Fish

Stoskopf MK. *Fish Medicine*. Saunders, 1993.

Noga EJ. *Fish Disease: Diagnosis and Treatment*. 2nd edition. Wiley-Blackwell, 2010.

Wildgoose WH. *BSAVA Manual of Ornamental Fish*. 2nd edition. British Small Animal Veterinary Association, 2001.

FURTHER INFORMATION

For further information contact the College Office

Telephone: International +61 (07) 3423 2016

Email: admin@anzcvs.org.au

Web: 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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