# European College of Zoological Medicine

## POLICIES & PROCEDURES, PART 2:

## ZOO HEALTH MANAGEMENT SPECIALTY

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The European College of Zoological Medicine (ECZM) recognizes five separate specialties under the ECZM umbrella; Avian, Herpetology, Small Mammal; Wildlife Population Health and Zoo Health Management.

The Zoo Health Management specialty (ZHM) Policies & Procedures, Part 2 document follows the structure below:


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# Introduction

Within the ECZM, Zoo Health Management (ZHM) is the specialty which deals with the special needs of animals kept in zoological collections. Spanning from neon tetras and poison dart frogs over dolphins to rhinos and elephants one could argue that this field is too vast to form the basis of a specialty, yet there is a distinct niche in the veterinary profession for those individuals who work in and for the zoological institutions. True for every discipline, but of paramount importance within ZHM is that prevention is better than cure, and preventative health programmes, surveillance and a close relationship with the "client" form the core of the work of ZHM diplomates. Benchmarking and leading education of future specialists within ZHM will set standards allowing zoo directors to locate and hire the most qualified veterinarians.

Animals in Zoos and aquaria deserve the very best, and it is the ambition of the College, that ZHM may aid in securing that there is a continued development of the discipline and that the zoo vets of the future will be better than they are today.

The policies and procedures, part 2 contain information about requirements for admission to the College, a profile of the Zoo Health Management specialty, and application and examination procedures.

The College is ruled by the following financial and operational principles:

a) The College is a non-profit organization and does not pursue commercial interests.

b) Financial means of the College may only be spent according to the Constitution.

c) Members of the College receive no payment from the funds of the College, except reimbursements.

d) Nobody may be favoured by expenditures or excessively high compensations, which are not according to the purposes of the College.

# Chapter 1. Objectives of the Zoo Health Management speciality

Zoo Health Management is a discipline-related speciality, and whereas many of the objectives of the speciality are shared with the taxon-related specialities there are important differences reflected in the following objectives:

The primary **objectives of the College** are to advance zoological medicine in Europe and increase the competency of those who practice in these fields by:

a) Establishing guidelines for post-graduate education and experience prerequisite to become a specialist in the specialities of zoological medicine.

b) Examining and authenticating veterinarians as specialists in the above specialties to serve animal owners (avian, herpetological and small mammal medicine), wildlife populations (wildlife population health), and zoological institutions (Zoo Health Management), respectively by providing specialist veterinary expertise.

c) Encouraging research and other contributions to knowledge relating to the relevant specialties of zoological medicine and promoting communication and dissemination of this knowledge.

d) In order to achieve these aims the following criteria are applied:

    I. A registered specialist shall spend at least 60% (i.e. > 24 hours/week) of the time working at the specialist level in the relevant specialty of zoological medicine (in the case of Zoo Health Management specialists, practicing the specialty is defined as being employed by or contracted to one or more zoological institutions on a basis of at least 24 hours/week).

    II. The training programme should be at least equivalent to those developed elsewhere (e.g. North America), thus enabling recognition of the training programme and specialist registration in other countries.

    III. The registration ceases by default when the specialty has not been practiced for two continuous years or the equivalent of two years during a period of 5 years.

e) Encouraging research and other contributions to knowledge relating to the relevant specialties of zoological medicine and promoting communication and dissemination of this knowledge.

Further objectives are:

a) Encouraging zoological institutions to use veterinary practitioners who are qualified to fill a unique and specific role in the delivery of modern comprehensive service in the relevant specialty area of zoological medicine at the specialty level.

b) Positioning the specialist in one of the specialties of zoological medicine as a common

source for referrals in the zoo and conservation community.

c) Improving and promoting the preventative and reactive healthcare of wild animals in zoos, and thereby improving the perception and understanding of the veterinarian's role by conservationists, scientists, governments and the public.

d) Providing an incentive and reward for achieving postgraduate education and experience in a specialty of zoological medicine at the specialist level. The title European Veterinary Specialist in Zoological Medicine (Zoo Health Management) should be restricted to those persons working in the field who have reached the highest level of achievement.

e) Encouraging interested veterinary colleges to establish in-depth instruction and high standards for training in zoological medicine, and develop specific funding for areas of needed research.

f) Promoting continued improvement of standards and knowledge in zoological medicine through continuing education and self-assessment.

g) Supporting the protection of animal species and their habitats by promoting the concept of wise use of animal resources and the breeding of endangered species in captivity.

h) Encouraging responsible management, care and propagation of all animal species both in captivity and the wild.

i) Preventing the occurrence of zoonotic and allergic diseases in humans originating from zoological species.

# Chapter 2: Requirements for admission to the European College of Zoological Medicine

***The requirements for admission to the College as a Diplomate and being a Specialist are specified in the Bylaws of the College, in line with the Policies and Procedures determined by the EBVS. The requirements listed below are a condensed version Chapter 4 of the Policies and Procedures, Part 1: General Information and the requirements found in Article 4 of the ECZM Constitution.***

Diplomates of the Zoo Health Management specialty appointed by the College are veterinarians who:

a) Have demonstrated fitness and ability in zoo health management by meeting the established training and experience requirements as assessed by the College, including publication requirements.

b) Have attained acceptable scores in the Zoo Health Management examination.

c) Demonstrate moral and ethical standing in the profession and practise scientific, evidence-based veterinary medicine, which complies with animal welfare legislation.

d) Practise in zoo health management for at least 60% of their time, based on a 40 hour working week (i.e > 24 hours/week).

e) Are re-evaluated every 5 years using a standard re-certification process.

Each individual who satisfies the above requirements shall be authorized to use the designation of Diplomate of the European College of Zoological Medicine (Zoo Health Management), abbreviated to DipECZM (Zoo Health Management). The individual is also awarded, by the EBVS, the title of European Veterinary Specialist™ in Zoo Health Management, following successful re-evaluation every 5 years.

Each Diplomate is expected to actively participate in the scientific and business affairs of the College.

Further information on specific requirements for prospective candidates is also found in the ECZM Policies and Procedures, Part 1: General Information.

The de-facto applications closed April 17th, 2017.

The requirements for de-facto applications followed the guidelines in the Bylaws section 2.3.

# Chapter 3: ECZM Zoo Health Management Residency Programmes

A Residency Programme, is a training programme allowing a graduate veterinarian ("Resident") to acquire in-depth knowledge of zoo health management and its supporting disciplines under the supervision and guidance of one or more Diplomates ECZM (ZHM) (”Diplomate”)

## 3.1 General objectives of the Training Programme:

3.1.1 To promote aptitude and clinical proficiency in management and medicine of species kept in zoological institutions.

3.1.2 To instruct the Resident in the science and practice of zoological medicine and its supporting disciplines, particularly preventative medicine, anaesthesiology, population management, nutrition and pathology.

3.1.3 To provide the Resident with the opportunity to pursue career goals in teaching, research, and/or specialty practice.

## 3.2 Detailed objectives of the Training Programme.

### 3.2.1 Knowledge and skills concerning professional contacts and transfer of knowledge.

The specialist should be able to:

- Express thoughts clearly, in oral as well in written form in the English language.
- Approach problems in an analytic, scientific way to find solutions and be able to assign priorities for these.
- Organize work efficiently.
- Make effective use of the available literature and find required information quickly.
- Develop scientific activities in order to contribute to the quality of the specialty.

### 3.2.2 General knowledge and skills concerning the specialty.

The specialist shall:

- Be able to assess the significance of health matters for the individual as well as for groups of animals housed in zoological institutions, and understand the consequences for the collection or the public.
- Be acquainted with the main current theories, principles and challenges of the specialty.
- Maintain up to date knowledge through conferences and literature.
- Conform to modern standards of skills and equipment.

### 3.2.3 Knowledge and skills concerned with obtaining help for problems that lie outside the specialty and/or facilities.

The specialist shall:

- Keep abreast of new developments in their specialty and become familiar with new methods, before applying these in practice.
- Understand the limitations of their specialty.
- Understand the possibilities that other specialities have to offer.
- Be familiar with the potential of multidisciplinary co-operation.

### 3.2.4 Knowledge and skills concerned with working as a professional specialist

A specialist should have extensive practical experience within the specialty. Through experience the specialist should have developed the self-confidence, self criticism and sense of responsibility that are essential for the practice of the specialty.

### 3.2.5 Knowledge and skills concerned with the general practice of zoological medicine.

A specialist in Zoo Health Management shall;

- Be able to handle emergencies in a zoological institution.
- Perform procedures and investigations according to the principles of good veterinary

practice.

- Cooperate with specialists and colleagues in other clinical and related disciplines to the benefit of human and animal health and welfare.
- Contribute to the development and application of concepts and methods in zoological medicine.

### 3.2.6 Specific knowledge and skills with regard to practising Zoo Health Management specialty.

#### 3.2.6.1 Areas and level of knowledge

A Zoo Health Management specialist should have a broad knowledge of the principles outlined below including:

- The taxonomy and the geographical distribution of animals commonly kept in zoological institutions.
- The general anatomy and physiology of the animals mentioned above. The specialist should be aware of important variations among the different taxa relevant to their specialty.

The Zoo Health Management specialist must have a thorough knowledge of preventative medicine as applied in zoological collections, including health programmes, disease screening, quarantine management, and vaccination programmes.

A detailed knowledge of the diseases of the relevant animals (aetiology, epidemiology, pathology, diagnosis, treatment and control) is required.

A detailed knowledge of the diagnostic possibilities in their respective patients, in relation to medicine (e.g. haematology, blood chemistry, endocrine tests, immunological tests, diagnostic imaging, diagnostic endoscopy, electrocardiography, aspiration biopsy, microbiology, cytology) and the ability to interpret results of these techniques is expected.

Zoo Health Management specialists must have sound knowledge of the principles of group and individual medication in their patients.

The Zoo Health Management specialist must have detailed knowledge of the legislation pertaining to their role in the zoological institution and as a veterinary practitioner in the field (e.g., CITES, legislation with regard to import and export of animals, animal welfare, capture from the wild, and the use of drugs, etc.).

The Zoo Health Management specialist must maintain good knowledge on zoonotic diseases and public health implications of animal disease.

The Zoo Health Management specialist must be able to assess diets, understand the formulation of diets for zoo animals and be aware of the current trends in animal nutrition. A sound knowledge of the interaction of nutrition and health is expected.

The Zoo Health Management specialist should have sound knowledge about population management including contraceptive techniques and drugs as well as assisted reproductive methods.

The Zoo Health Management specialist should have good knowledge about animal management related issues including enclosure design, environmental enrichment techniques, studbooks and the working of European endangered species programmes and taxon advisory groups.

Theoretical knowledge should be to the level of current textbooks (see current Reading list on website). Furthermore, it is essential to be aware of the relevant scientific literature published over the previous five years in representative journals (see Reading list on website).

The ZHM members of the Scientific Committee are responsible for leading the ZHM Reading List update each year. The ZHM members of the Scientific Committee can construct a Reading List Working Group should they wish to do so. Regardless, the ZHM members of the Scientific Committee need to ensure that the ZHM Lead of the Examination Committee as well as the ZHM Specialty Chair are consulted in the process with the reading list update. After an updated version of the reading list has been completed by ZHM members of the Scientific Committee and/or the Reading List Working Group, the ZHM Scientific Committee Lead shall circulate this updated version to all ZHM diplomates for consultation by February 1st. Following this, all ZHM diplomates can make suggestions to additional edits of the reading list up to March 1st. Simple majority voting on the Reading List should be concluded the latest by April 1st of the year prior to the exam that the updated Reading List is intended for.

**3.2.6.2 Technical experience**

- The Zoo Health Management specialist should have had extensive practical experience with a wide variety of species kept in zoological institutions.
- The Zoo Health Management specialist must be competent in the various skills

associated with the field including history taking, and clinical examination including sample collection and medication methods.

- The Zoo Health Management specialist should be familiar with the techniques of remote injection, anaesthetic management and physical restraint of animals of various taxa.

## 3.3 Specific Programme description

The Resident must work under the supervision of an ECZM (Zoo Health Management) Diplomate. For at least 80% of the 3 year programme the Resident must work with zoological medicine, and for at least 60% of the 3 years, this work must be conducted in or with one or more zoological institutions. This work may be undertaken at a single institution or may require time to be spent in one or more partner institutions. Either route requires direct supervision from a Diplomate in Zoo Health Management or equivalent approved by the Education Committee.

Resident responsibilities: the degree of responsibility assumed by the Resident shall be appropriate to the nature of the procedure and training experience.

The Resident shall be responsible for:

a) Direct interactions with keeper and management staff during clinical rounds.

b) Writing, updating and executing preventative medicine protocols.

c) Supervising daily management of hospitalized animals and sick animals in enclosures.

d) Providing optimal clinical service and prompt professional communications.

The caseload of the institution(s) must be large enough to afford the candidate adequate exposure to multiple taxa and disciplines. Supervised “externships” at additional institutions that complement the case load are encouraged but care must be taken to ensure that overall supervision by an ECZM ZHM Diplomate does not fall below the required 80% level. While a minimum case load is necessary to develop clinical experience, the candidate must also be provided with sufficient time to evaluate patients properly, to study, and to participate in rounds, workshops, work with other board-certified specialists and to lecture.

### 3.3.1 Preventative Medicine

Through the Programme, the Resident should:

a) Design and implement preventative medicine programmes including quarantine, vaccination and parasitology protocols.

b) Participate in public health management in the zoological institution(s) including pest (rodent, insect etc.) control, surveillance programmes and zoonosis prevention.

### 3.3.2 Clinical Zoo Medicine

Through the Programme, the Resident should:

a) Acquire a broad knowledge of anatomy, physiology, and behaviour of mammals, birds, reptiles, amphibians, fish and invertebrates commonly kept in zoos.

b) Acquire a comprehensive knowledge about infectious and non-infectious diseases of the species commonly kept in zoological institutions.

c) Be able to perform routine health checks and diagnostic procedures and be able to interpret diagnostic results such as haematology, biochemistry, cytology and diagnostic imaging.

### 3.3.3 Restraint and anaesthesia

Over the Programme, the Resident should:

a) Acquire knowledge of the techniques and equipment used to physically restrain various taxa of zoo animals, and to be able to perform physical restraint.

b) Acquire knowledge of the principles of remote drug delivery devices, field anaesthesia techniques and pharmaceuticals.

c) Perform inhalation and injectable anaesthesia.

d) Apply and interpret appropriate anaesthetic monitoring including capnography, pulse oximetry and arterial blood gas analysis.

e) Acquire appropriate knowledge about fluid therapy.

### 3.3.4 Animal Management in the Zoological Collection

The Resident should be involved in and acquire active knowledge on:

a) Animal welfare.

b) Enclosure design and evaluation.

c) International studbooks, taxon advisory groups and endangered species programmes.

d) Import and export regulations (e.g., TRACES, CITES and EU Animal Health Law AHL).

e) Population control including contraceptive techniques.

f) Assisted reproduction.

g) Environmental enrichment, stereotypies and behaviour-modifying drugs.

h) Evaluation and design of diets for animals in zoological collections.

### 3.3.5 Comparative Pathology and Disease Investigation

Over the Programme, the Resident should:

a) Be able to perform gross post-mortem examinations.

b) Be able to take appropriate samples for further diagnostics.

c) Be able to perform basic laboratory work including parasitology, cytology and basic bacteriology.

d) Be able to interpret histopathology results.

During the residency period the resident must obtain at least 20 working days of training under the supervision of a Diplomate of the European or American College of Veterinary Pathology or their equivalent.

### 3.3.5 Research and Academic Studies

Over the Programme, the Resident should:

a) understand how to design research projects within the constraints of a zoological setting.

b) undertake one or more such research projects which constitute 20% of the resident

time over the three-year period.

c) write and publish peer reviewed articles.

d) give presentations at national or international conferences.

Residents must be given a clearly allocated period of time to:

- Do research or clinical investigation.
- Prepare scientific manuscripts.
- Follow graduate degree studies if deemed necessary.
- Follow external zoological rotations with the approval of the Programme supervisor in order to see different species than usually exposed to.

The following conferences are recommended for attendance:

- International Conference on Diseases of Zoo and Wild Animals of the European Association of Zoo and Wildlife Veterinarians (EAZWV).
- Wildlife Disease Association (WDA) International Conference.
- Annual conference of the American Association of Zoo Veterinarians (AAZV).
- Scientific meeting of the European College of Zoological Medicine.
- Veterinary anaesthesiology conferences.
- Other scientific meetings, including human medical conferences.

Participation in at least two such international conferences, relevant to the specialty is required during the residency period. Active participation (such as oral or poster presentations etc.) is encouraged but is not a requirement for credentialing.

### 3.3.6 Performance Monitoring of Resident

The resident is responsible for maintaining and timely submission of the reporting package to the Education and Residency Committee as described in Policies and Procedures; Part 1, sections 5.6.

The Zoo Health Management is considered a clinical residency programme and therefore follows the report submission frequency 3-3-6-6-6-6 months (Policies and Procedures: Part 1, section 5.6.1). The reports must be maintained and submitted in the officially approved specialty report templates as described below:

**3.3.6.1 Case and Activity Log,** composed of:

a. **Resident Clinical Zoo Medicine Log** listing clinical cases (of groups or individuals) and medical interventions. The log should include date of procedure, animal ID, species, brief problem description and "discipline" (see specific excel log). Also a brief account of methods used for restraint and anaesthesia must be included. The log should detail whether the resident was the primary veterinarian or assisting a senior colleague.

b. **Resident Comparative Pathology and Disease Investigation Log** containing species, date, investigations undertaken, and main postmortem diagnoses.

c. **Resident Continuing Education Log** listing conferences, seminars and lectures attended.

d. **Resident Presentation Log** listing presentations given at zoological medical conferences and other professional meetings.

**3.3.6.2 Resident Progress Report** as described in P&P1 pg 14

**3.3.6.3 Supervisor Progress Report** as described in P&P1 pg14

**3.3.6.4 Annual Resident Evaluation** form as described in P&P1 pg 14.

Additionally, to the above Case and Activity Logs, Resident Progress Report and Supervisor Progress Report, the following specialty specific reports are required:

**3.3.6.5** *Preventative Medicine Case Report* analysing an enclosure or a species/taxon in the affiliated zoological institution must be submitted **by the end of the first year of the residency**. The report must be under 1,500 words. The report should cover the current health status, a review of existing programmes, a list of problems identified, and a proposal for a preventative medicine programme.

**3.3.6.6** *Animal Management Report* describing a significant animal management issue in the affiliated zoological institution(s) must be submitted **by the end of the second**

**year of the residency**. The report must be under 1,500 words. The report which could cover topics in enclosure design, import/export, reproductive problems, nutritional management etc., should include a description of the challenge/background and a proposal for a management plan.

In addition to the logs, the resident shall be able to submit randomly selected examples of full clinical history reports or pathology reports of individual cases if requested by the Education and Residency Committee.

#### 3.3.7 Publications:

The Resident must author three (3) original peer-reviewed scientific papers in Zoo Health Management, in a well-established internationally refereed scientific journal (i.e. mentioned in the Science Citation Index). Of at least two (2) of these papers the applicant must be the first author. **The subject matter of these papers must cover at least two different classes of animals**, and at least one of the first author publications must be the result of an original research project. **For credentialling, publications must be already published or fully accepted for publication as evidenced by a letter from the editor.** At least one of the three publications should be published or accepted for publication within the 5 years leading up to credentialing for the examination.

## 3.4 Facilities, services, and equipment required in a European College of Zoological Medicine-approved Zoo Health Management Residency Programme.

**(**Please refer to the Residency programme self-check list in appendix 1).

#### 3.4.1 Medical library:

A library containing recent textbooks and current journals relating to the specialty and its supporting disciplines (and minimally containing all titles on the reading list) must be immediately accessible to the Programme participants (working collection).

#### 3.4.2 Medical records:

A complete medical record must be maintained for each individual case and rapid retrieval of information about any patient or flock/group should be possible.

### 3.4.3 Diagnostic imaging services:

a) Radiology. Appropriate equipment for comprehensive radiographic imaging must be available together with safe radiation working practices.

b) Ultrasonography. Appropriate equipment for ultrasonographic imaging must be available.

### 3.4.4 Pathology services:

a) A separate post-mortem facility needs to be available for gross post-mortem examinations.

b) A clinical pathology laboratory for haematology, clinical chemistry, microbiology, and cytological diagnosis must be available. Clinical pathology reports must be retained and retrievable.

c) Facilities for histopathological examination of necropsy tissues must be available. Anatomic pathology reports must be retained and retrievable.

(Note: Items listed in this section can be provided by a close-by referral centre.)

### 3.4.5 Medical and surgical facilities:

a) Clinical examination room: the examination room must be designed, constructed, used, and maintained consistent with the current concepts of practice. They must be sufficient in number and size to accommodate the case load.

b) Surgical facilities: facilities including appropriate instrumentation for basic surgical procedures must be available, but a separate surgical room is not required.

c) Hospitalization areas: Areas for isolation and good nursing should be available with consideration to biosecurity and control of pathogen spread between patients.

d) Isolation unit/quarantine area: An area for isolation of animals entering the facility must be available.

e) Anaesthetic and critical care equipment: appropriate anaesthetic and critical care equipment must be available. Remote injection systems as well as gaseous anaesthesia equipment are mandatory. Equipment for monitoring of anaesthetic patients including blood pressure measuring devices, pulse oximeters and capnographs is required.

f) Instrumentation: a full complement of instrumentation for diagnostic and surgical

procedures must be available.

g) Photography: photographic equipment for the documentation of disease must be available.

h) Sterilization: Appropriate sterilization of surgical instrumentation and supplies must be available, and the sterilization capacity must be commensurate with the caseload.

**3.4.6** Animal **collection:**

a) Housing conditions should be up to current standards, and the institutions should be accredited by appropriate national authorities.

b) The resident should be exposed to a broad variety of animals, and the collection (s) in which they work should comprise at least three (3) orders within at least two (2) classes of animals. A multiple facility approach is desired.

c) The caseload of the institution(s)/programme must be large enough to afford the candidate adequate exposure to all required phases of practice of the specialty. In practice case-load must exceed 650 cases /year.

d) A programme must achieve or exceed the following annual case numbers based on taxa:

| | |
|---|---|
| Invertebrate | 6 |
| Fish | 20 |
| Amphibian | 20 |
| Reptile | 30 |
| Avian | 30 |
| Marsupial | 20 |
| Rodent/Lagomorph | 20 |
| Large carnivore | 10 |
| Other carnivore | 20 |
| Great ape | 10 |
| Other non-human primates | 20 |
| Marine mammal | 10 |
| Hoof stock | 20 |
| Megavertebrate | 10 |

e) And the following case numbers based on discipline:

| | |
|---|---|
| Emergency/critical care | 50 |
| Transport/shipment | 60 |
| Preventative health | 60 |
| Reproductive | 30 |
| Infectious disease | 40 |
| Nutritional | 10 |

| | |
|---|---|
| Non-infectious disease | 40 |
| Behavioural management | 5 |

f) The following numbers of pathology cases are also required::

| | |
|---|---|
| Invertebrate | 1 |
| Fish | 5 |
| Amphibian | 5 |
| Reptile | 10 |
| Avian | 15 |
| Mammal (must cover 4 taxon groups) | 15 |

# Chapter 4: Examination Credentialing and Application Procedure

## 4.1 Examination Credentialing

The process, documentation, and deadlines required to credential to sit an ECZM examination is detailed in chapter 6 of the Policies and Procedures, Part 1: General Information.

Listed below is a **summarized** version of that section with reference to specific Zoo Health Management requirements. Applicants are advised to refer to **BOTH** this list and section 6.4. of the Policies and Procedures, Part 1: General Information, in order to submit a complete application for examination credentialing.

a) **Covering Letter**.

b) **Curriculum Vitae**.

c) **Reference letter(s)** from the programme supervisor(s) of each institution involved in the training programme.

d) **Documentation logs**. For Zoo Health Management these include Resident Clinical Zoo Medicine Log, Resident Comparative Pathology and Disease Investigation Log, Resident Continuing Education Log, Resident Presentation Log, Preventative Medicine Case Report and Animal Management Report. If the training programme is not yet finished then the logs must be complete up to the time of application.

e) **Case Reports are NOT required** in Zoo Health Management.

f) **Publications**. The Resident must author three (3) original peer-reviewed scientific papers in Zoo Health Management, in a well-established internationally refereed scientific journal (i.e. mentioned in the Science Citation Index expanded. Of at least two (2) of these papers the applicant must be the first author. **The subject matter of these papers must cover at least two different classes of animals**, and at least one of the first author publications must be the result of an original research project. **For credentialling, publications must be already published or fully accepted for publication as evidenced by a letter from the editor.** At least one of the three publications should be published or accepted for publication within the 5 years leading up to credentialing for the examination Any relevant previous correspondence relating to the training programme and application.

g) Evidence of payment of Credentialing for Examination fee.

The application materials must be arranged as detailed above and sent electronically to the ECZM Secretary before the deadline. Any subsequent correspondence should be through the Secretary unless advised otherwise. All submitted application materials become the sole property of the ECZM and will not be returned to the applicant.

## 4.2 Applying for and sitting the examination

The Zoo Health Management examination and application process, follows the general format of all College examinations as detailed in **Chapter 7** of the Policies and Procedures, Part 1: General Information. Candidates are advised to read that chapter alongside this section, so they are fully informed about all aspects of the application and examination.

The Zoo Health Management examination will aim to test all aspects of the specialty. It will be composed of two sections:

a) The first section consists of 175 multiple choice questions each worth one point (total available this section; 175 points). Each multiple-choice question consists of two parts: the stem and the responses. The stem is the introductory statement or question. The responses are suggested answers that complete the statement or answer the question asked in the stem. For each question, there is one correct response, and 4 distractors.

b) The second part consists 20-24 “stations” each containing a presented scenario with a short essay question or a practical question with physical/photo/video material with specific questions. Short written answers of a few words to a sentence are expected. (Total this section 250 points)

The integrity of the Diplomate status examination will be maintained by the European College of Zoological Medicine to insure the validity of scores awarded to candidates.

All other polices and deadlines regarding the exam are found in **Chapter 7** of the Policies and Procedures, Part 1: General Information.

# Chapter 5: Zoo Health Management Approved Residency Training Sites

The Zoo Health Management Specialty currently has 10 approved residency sites

| Institution | Location | Supervisor(s) | Re-accreditation Year |
|---|---|---|---|
| Bristol Zoo Gardens | Bristol, United Kingdom | Michelle Barrows | 2027 |
| Chester Zoo | Chester, United Kingdom | Javier Lopez, Gabby Drake | 2026 |
| Copenhagen Zoo | Frederiksberg, Denmark | Mads Bertelsen, Stamos Tahas | 2029 |
| Lincoln Park Zoo | Chicago, United States | Kathryn C. Gamble | 2029 |
| Parc Zoologique de Paris | Paris, France | Alexis Lécu | 2029 |
| Royal Zoological Society of Scotland (Edinburgh Zoo) | Edinburgh, United Kingdom | Stephanie Mota | 2029 |
| Twycross Zoo | Twycross, United Kingdom | Pip Dobbs | 2030 |
| ZooParc de Beauval | St Aignan, France | Antoine Leclerc | 2028 |
| Zoological Society of London | London, United Kingdom | Amanda Guthrie | 2030 |
| Mandai Wildlife Group – Singapore Zoo | Singapore | Yirui Heng | 2030 |

# Chapter 6: ECZM Zoo Health Management Reading List

## Reading List for Certifying Examination

Updated May 2026 (valid for the 2027 exam)

**This recommended reading list is provided to guide exam candidates in their studying.** The sources are common textbooks and scientific journals that represent the appropriate level of zoological medicine knowledge for Zoo Health Management candidates. For textbooks, the candidate should review the issues in this list. For the journal literature, candidates should focus on those articles published within the last five years. Articles published online ahead of print are also included. For the 2027 examination, candidates should focus on journals published between 01 January 2022 to 31 Dec 2026. Candidates are free to utilize other sources so that they can have a broad understanding of the concepts and for a deep dive into important topics. Examination questions will be referenced from these sources with no more than 3% of the exam from resources outside the list below.

## Core Journals

*Only articles with Zoo Health Management Focus*

- American Journal of Veterinary Research
- Journal of Avian Medicine and Surgery
- Journal of Wildlife Diseases
    - Only the Review and Short Communications sections
- Journal of Herpetological Medicine and Surgery
- Journal of Zoo and Aquarium Research
- Journal of Zoo and Wildlife Medicine
- Zoo Biology
- Journal of the American Veterinary Medical Association
    - AVMA Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2023
        - Open Access Document link : https://avmajournals.avma.org/view/journals/javma/261/12/javma.23.05.0280.xml
    - AVMA Guidelines for the Euthanasia of Animals: 2020 Edition
        - Open Access Document link : https://www.avma.org/sites/default/files/2020-02/Guidelines-on-Euthanasia-2020.pdf

## Core textbooks

**Zoo and Wild Animal Medicine.** 2007, 2014, 2018, 2023 W.B. Saunders. Select Volumes listed below.

- 7th (Chapter: 58, 79)
- 8th (Chapters: 1-67, 69, 74, 79, 81)
- 9th (Chapters: 10, 13-15, 21-23, 26-27, 33, 35, 38-39, 46-49, 51-54, 56, 59-60, 62-65, 67, 71, 73, 75, 77-80, 82-88, 90-96, 99)
- 10th (Chapters: 22-24, 29-31, 34, 37, 39-43, 47, 49-54, 55, 59, 61, 63, 65-66, 68-70, 72-73, 80-83, 87-90, 91,93-96, 100-101, 109-110)

**Zoo Animal and Wildlife Immobilization and Anesthesia**. 3rd ed. West, Heard, Caulkett (eds). 2025. Blackwell.

- Chapters: 1-5, 7-8 (excluding tables), 9-57

**Current Therapy in Avian Medicine and Surgery**, 1ed. Speer. 2015. WB Saunders.

- Pages: 28-106, 252-530, 555-581, 589-709, 713-717

**Clinical Guide to Fish Medicine** Hadfield, 2021. John Wiley & Sons.

- Chapters: A1-A3, A6-A15, C1-7

**CRC Handbook of Marine Mammal Medicine**. 3rd Ed. Gulland, Dierauf, and Whitman. 2018 CRC Press.

- Chapters: 7, 10 ,13, 14, 17- 20, 22-24, 26, 27, 31, 40-45

**Pathology of Wildlife and Zoo Animals**, 1st ed, Terio, McAloose, St. Leger. 2018. Academic Press.

- Chapters: 1, 3, 5, 9, 10, 14- 17, 29, 31-33, 35-38

**Reptile & Amphibian Medicine and Surgery**, 3rd ed, Mader and Divers. 2019. Elsevier.

- Chapters: 7-12, 17-19, 29-35, 43, 47, 48-52, 90, 97-101, 107, 114-120, 122, 130, 140, 143, 147, 148,
  150, 151, 153-155, 157, 158, 163, 167, 169, 171, 172, 174, 178

**How to read a paper-The basics of evidence-based medicine** T. Greenhalgh, 2019 Wiley-Blackwell.

- Chapters: 3-6, 8-9

**Invertebrate medicine** 3rd ed Lewbart. 2022. Blackwell Publishing.

- Chapters: 8,9,14,15,20,25,27,29

**Exotic Animal Hematology and Cytology**, 5th ed, Campbell and Grant. 2022. John Wiley & Sons.

- Chapters: 2-3, 10-11, 18-19, 20, 23

# Appendix 1: ECZM-ZHM self-assessment checklist for approval of residency training sites

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| Zoological collection(s):<br>o Nationally approved facility<br>o Collection(s) must cover a broad spectrum of species and include representatives of at least three (3) orders from at least two (2) classes. | |
| Caseload:<br>The caseload of the institution(s) must be large enough to afford the candidate adequate exposure to all required phases of practice of the specialty. In practice case-load must exceed 650 cases /year.<br>Please fill in approximate average annual case load over last 5 years:<br>Taxon-based<br>o Invertebrate<br>o Fish<br>o Amphibian<br>o Reptile<br>o Avian<br>o Marsupial<br>o Rodent/Lagomorph<br>o Large carnivore<br>o Other carnivore<br>o Great ape<br>o Other non human primates<br>o Marine mammal<br>o Hoofstock | |

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| ○ Megavertebrate<br><br>Discipline-based<br>○ Emergency/critical care<br>○ Transport/shipment<br>○ Preventative health<br>○ Reproductive<br>○ Infectious disease<br>○ Nutritional<br>○ Non-infectious disease<br>○ Behavioural management | |
| **Medical records**: a complete medical record must be maintained for each individual case and rapid retrieval of information about any patient or flock should be possible.<br>○ ZIMS or equivalent (name of programme) is used. | |
| Diagnostic imaging equipment<br>○ Radiography equipment.<br>○ Ultrasonography equipment.<br>○ Endoscopy equipment.<br>○ CT (can be off site).<br>○ MRI (can be off site). | |
| **Clinical pathology**: a clinical pathology laboratory for haematological, clinical chemistry, microbiological, parasitological and cytological diagnosis must be available. Access to a veterinary diagnostic laboratory for samples not processed in house.<br>○ Microscope. | |

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| ○ Equipment/supplies for staining and for faecal analysis.<br>○ Blood chemistry bench top or portable analyser/ blood gas analyser. | |
| **Pathology services**: Morphologic pathology: a separate room for gross pathological examination must be available. Facilities for histopathological examination of necropsy tissues must be available. Anatomic pathology reports must be retained and retrievable.<br>○ PM-room<br>○ Access to histology service.<br>○ Microscope available to resident to review slides. | |
| **Medical and surgical facilities**: Clinical examination rooms: the examination rooms must be designed, constructed, used, and maintained consistent with the current concepts of practice. They must be sufficient in number and size to accommodate the case load.<br>○ Appropriate clinical examination room.<br>○ Appropriate sterile surgical suite | |
| **Isolation facilities/Quarantine areas** including appropriate consideration to biosecurity and control of pathogen spread between units.<br>○ Appropriate isolation facilities. | |
| Anaesthetic and critical care equipment:<br>Appropriate anaesthetic and critical care equipment must be available.<br>○ Remote injection equipment.<br>○ Range of induction masks and endotracheal tubes, pharmacological agents and suitable circuits.<br>○ Gaseous vaporiser together with an adequate scavenging system.<br>○ Anaesthetic monitoring equipment.<br>○ Ready to hand emergency resuscitation equipment. | |
| **Surgical instrumentation**: a full complement of general and special instrumentation for diagnostic and surgical procedures must be available. | |

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| ○ Appropriate surgical equipment for collection animals. | |
| **Photography**: photographic equipment for documentation of disease must be available.<br>○ Digital camera and option for image storage. | |
| **Sterilisation**: Steam, heat, or gaseous sterilisation of surgical instrumentation and supplies must be available.<br>○ Sterilisation equipment. | |
| **Staff:** Resident should work with multiple veterinarians, veterinary technicians/ keepers.<br>○ At least one veterinarian on staff outside primary ECZM mentor<br>○ At least one veterinary technician or equivalent on staff | |
| **Medical library**: a library containing recent textbooks and current journals relating to Zoological Medicine and its supporting disciplines must be immediately accessible to the Resident.<br>○ The resident must have access to all titles on the current reading list (can be electronic through university). | |

In the case of self-assessment:

I, the responsible programme supervisor, attest that the above is an accurate indication of facilities available and will provide additional information or documentation as requested by the Education and Residency Committee.

Signed Dated

For self-inspections, please provide a series of photographs documenting the facilities and above confirmed equipment.