

REF. NO.	C –VC 2
TITLE:	CARDIOVASCULAR DIAGNOSTICS
VALUE:	10 CREDITS
NOTIONAL STUDY HOURS:	100

GENERAL GUIDANCE NOTES

The following applies to all C modules.

Before embarking on this, or other modules, candidates must fulfil the following criteria:

- a) Be a member of RCVS
- b) Have at least one year's postgraduate experience working as a veterinary surgeon
- c) Be enrolled with RCVS if intending to take the Certificate in Advanced Veterinary Practice (enrolment will be valid for 10 years)
- d) It is also recommended that candidates will have already declared themselves competent in their 'Year One Competencies', by completing the Professional Development Phase (PDP) before enrolling for any modules.
- e) To attain the certificate in advanced Veterinary Practice (Cardiology) the candidate must also complete modules C-VC1 and CVC-3

Learning Objectives

The module is focused on making a diagnosis of cardiovascular disease using the appropriate techniques. It is not concerned with the therapeutics or management of animals with cardiovascular disease as this is the concern of modules C-VC3.

The module is aimed at veterinary surgeons in private practice, or at a veterinary school with a substantial case load of small or large animals, or a mixture, of which a significant number have primary cardiovascular disease, or require through examinations of their cardiovascular system for investigation of other systemic illnesses, or injury. At least 200 of these should be examined and assessed primarily by the candidate.

The module may be taken from a large animal or a small animal perspective, or a mixture of the two. It is suggested that candidates intending to proceed to a Certificate in Advanced Veterinary Practice (Cardiology) via modules C-VC 1 and C-VC 3, will present a C-VC 1 made up of a balanced distribution of species with at least 2 being represented. Alternatively, if candidates are intending to proceed to the advanced clinical practice (cardiology) with a large animal/equine bias) via Equine Practice, the case diary should be made up of 90% large animals. Candidates not wishing to use the module to attain the certificate in advanced Veterinary Practice (Cardiology) can present case books made up exclusively from small, or large animal cases.

Module C-CV2 is mandatory for those aiming to achieve the CertAVP (cardiology).

ASSESSMENT STRATEGY FOR THIS MODULE

It is suggested that this module could be assessed by the following methods:

- A **case log**, which documents at least 200 cases seen by the candidate over the period that the module is being completed. Any animal requiring a thorough examination of the cardiovascular system may be included. An example of the appropriate information to be included in the case log is attached as Annex A and examples are appended
- A **case log** of ten cases, each of up to 500 words in length. These cases will be selected by the candidate from 15 cases from the case log chosen by the examiners and will include an appropriate balance of cases to encompass the breadth of cardiovascular disorders in the domestic species familiar to the candidate. The candidate will be required to submit copies of the diagnostic material used in each case to make their final diagnosis and be expected to demonstrate a logical and critical case-orientated approach for the assessment of the commonly encountered cardiovascular disorders in the domestic species.

Module Content

At the end of the module, candidates should be able to:

- To select, appropriate diagnostic techniques for small or large animal patients based on their history and clinical findings (auscultation, physical examination).
- To be able to diagnose acute cardiac failure and shock
- To show an understanding of the balance between patient care and patient stabilisation before extensive diagnostic procedures are undertaken.
- To show competence in acquiring the appropriate diagnostic materials from the tests and procedures selected. Eg Electrocardiographs, radiographs and echocardiographs must all be of diagnostic quality and the scope of each examination sufficient to satisfy the diagnostic question being asked.
- To have the ability to critically assess and measure the diagnostic material once it has been derived
- To show competence in interpreting all of the diagnostic material that the candidate has acquired from each case and integrating all of the elements of their diagnostic work up to determine a final diagnosis.
- To provide an accurate diagnosis after their series of diagnostic tests have been completed.

For the purposes of the case log the candidate **MUST** have performed a full clinical examination on each animal entered

1. Clinical examination:

- Auscultation—presence of murmurs, gallop sounds, arrhythmias or inappropriate rates, examination of the respiratory system
- Pulse palpation—rate, character and rhythm.
- Mucous membranes and peripheral perfusion—assessment of mucous membrane colour and refill time and adequacy of peripheral perfusion
- Examination for extra-cardiovascular manifestations of cardiovascular disease and failure.

The candidate is then expected to choose appropriately from the following core list of ancillary diagnostic aids, or if clinical examination is sufficient to make a final diagnosis of the cardiovascular abnormality eg in a case of hypovolaemic shock, the candidate can proceed to this as a final diagnosis in the case log.

2. Ancillary Diagnostic aids

(a) Electrocardiography—

The candidate must then be able to:

- Calculate heart rate,
- Assess heart rhythm,
- Assess cardiac conduction and waveform shapes

- Detect evidence of cardiac enlargement
 - Understand the application of Holter or other long term ECG monitors
- (b) **Measurement of arterial blood pressure:**
- Direct and indirect methods
- (c) **Radiology**
- The candidate should understand the basic principles of radiography and recognize common film faults
 - Additionally the candidate should demonstrate an understanding of:
 - radiographic anatomy of the cardiovascular and respiratory system;
 - radiographic changes in all organs associated with cardiovascular disease;
 - radiographic changes in cardiac failure;
 - principles and indications for angiography
- (d) **2-D and M-mode Echocardiography**—acquisition, recognition, measurement and interpretation of standard 2D and M-mode images;
- The candidate should understand the basic principles of echocardiography, recognize common faults and be familiar with and capable of obtaining the standard views of the heart appropriate to their species bias.
 - Recognise and describe **normal echocardiographic anatomy**. (Candidates should possess a detailed knowledge of normal cardiac anatomy of the dog, cat and horse and of the variations with breed and age, as appropriate to the case log.
 - An understanding of how common cardiovascular diseases affect the cardiac chambers and the standard measurements made
 - A knowledge of common artefacts and an understanding of the potential pitfalls of an echocardiographic study
- (e) The basic principles and applications of **Doppler echocardiography** including knowledge of common artefacts and an understanding of the potential pitfalls of Doppler echocardiographic methods.
- (f) **Laboratory tests**—in particular renal function, liver enzymes, electrolytes, blood gases and haematology. Knowledge of specific laboratory tests for cardiac disease eg cardiac troponins etc

For radiography and echocardiographic images, the candidate will be expected to demonstrate via their case reports that they are able to recognise and explain faults, when present in their diagnostic material

Note on cases:

The scope of the examination is related to the recognition and diagnosis of conditions that commonly affect the cardiovascular systems of the domestic species that are regularly encountered in general veterinary practice. Therefore, in selecting cases for the 10 reports, examiners will be choosing a representative sample of cases to encompass these conditions:

- acute cardiac or cardiovascular failure
- chronic cardiac failure
- acquired and congenital heart disease
- cardiac arrhythmias
- thromboembolic disease
- cardiac disease secondary to other systemic diseases

ANNEX 1

Guide on Information to be included in the case log.

- (a) Date
 - (b) Name/case number/ unique identifier
 - (c) Signalment: inc breed, age
 - (d) Brief list of presenting signs eg cough, collapse, exercise intolerance
 - (e) Abnormal auscultation and physical exam findings pertinent to the cardiovascular system; murmur, gallop, arrhythmia, Heart rate if abnormal, other; eg inspiratory rales. Increased respiratory rate, abdominal distension, pyrexia etc
 - (f) List of ancilliary diagnostic tests in the order in which they were performed and their most significant outcomes
 Eg . ECG normal
 Radiographs: slight LA enlargement
 Echocardiography : irregular mitral valve thickening, MR detected by Pulsed Doppler, left atrial enlargement on 2-D
- (a) Final Diagnosis

Example Cardiology Case Log (Based on ACVIM Cardiology case log)

DATE	Case No. & Client Name	Age, Sex, Breed	E C G	X R A Y	M M O D E	2 D	D O P P L E R	Other Diagnostics	Diagnosis	Treatment and Follow-up
05.01.07	697708 Smith	12 y MC LABR	x	x	x	x	x	Bloodwork	DCM, left sided CHF, VPCs	Furosemide, Pimobendan, Benazepril Recheck 1 week
05.01.07	697718 Brown	9 yo FS DSH	x	x	x	x	x	Doppler systolic blood pressure	HCM	Benazepril

Example Key:

- MC – male castrated
- FS – female spayed
- LABR – Labrador retriever
- DSH – Domestic Shorthair
- CHF – Congestive heart failure
- VPCs – Ventricular premature complexes
- HCM – Hypertrophic cardiomyopathy