



## SPECIALTY CERTIFICATION AND RESIDENCY TRAINING MANUAL: CARDIOLOGY

### Cardiology Specialty Specific Certification and Residency Training Manual for Residents, Candidates, Sponsoring Institutions, Program Directors, Resident Advisors, Supervising Diplomates, and Secondary-Specialty Supervising Diplomates

Effective July 1, 2024 – June 30, 2025

The information contained in this Manual becomes effective on July 1, 2024. Along with the ACVIM Certification Manual (CM), it represents the current policies, procedures, and requirements for individuals involved in the Cardiology certification processes of the American College of Veterinary Internal Medicine (synonyms: ACVIM or the College).

ACVIM policies, procedures and requirements are subject to periodic review and change. All residents, Candidates, sponsoring institutions, program directors, resident advisors, supervising diplomates, and secondary-specialty supervising diplomates must read the current and relevant Certification and Residency Training Manuals.

While a concerted effort has been made to ensure the accuracy of this document, if clarification is required, program directors, resident advisors, supervising Diplomates, secondary-specialty supervising Diplomates, residents, and Candidates should contact the ACVIM certification and accreditation staff at the ACVIM office, preferably by email at [certification@acvim.org](mailto:certification@acvim.org), or by mail or phone, as referenced below.

If program directors, resident advisors, supervising Diplomates, secondary-specialty supervising Diplomates residents, and/or Candidates have any questions, or if concerns arise about proposed or actual changes that could impact the certification and/or residency training processes, they should contact the ACVIM certification and accreditation staff at the ACVIM office, preferably by email at [certification@acvim.org](mailto:certification@acvim.org) or by mail or phone, as referenced below.

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The ACVIM certifies specialists in veterinary cardiology. Cardiologists focus on diagnosing and treating diseases of the cardiovascular system. This Manual explains the policies, procedures and requirements for Candidates working toward certification in this specialty and the specific requirements for ACVIM cardiology residency training programs (RTPs), that are in addition to the requirements specified in the Certification Manual (CM) which are required of all Candidates in all specialties.

## 1 CARDIOLOGY DOCUMENTS AND FORMS

The following may *not* be an exhaustive list of applicable documents and forms. Please navigate to the [ACVIM website](#) for additional documentation and forms.

- [Online Candidate Registration Form](#) (via Candidate Dashboard).
- [Cardiology Log Acceptable Abbreviations document](#).
- [Cardiology Log Summary Form](#) .
- [Cardiology Catheterization Log](#).
- [Cardiology Echo Log](#) .
- [Cardiology Education Log](#).
- [General Examination registration](#) (via Candidate dashboard).
- [General Examination blueprint, reading list & study resources](#) (60 days before the examination date).
- [Cardiology Credentials Packet](#) (prerequisite for the Specialty Examination)
- [Cardiology Specialty Examination registration](#) (via Candidate dashboard).
- [Cardiology Specialty Examination blueprint, reading list & study resources](#) (60 days before the examination date).

## 2 DEFINITIONS FOR CARDIOLOGY CANDIDACY AND RESIDENCY TRAINING PROGRAMS

Review important definitions related to the specialty of cardiology in [Appendix A: Important cardiology-related definitions](#). These definitions expand upon those provided in the Certification Manual as they pertain specifically to the specialty of cardiology.

## 3 THE CARDIOLOGY RESIDENCY TRAINING PROGRAM (RTP)

The residency training program (RTP) is the foundation for the education and training of ACVIM cardiology Candidates seeking certification as ACVIM cardiology Diplomates.

All the general requirements for residents and residency training found in the ACVIM Certification Manual must be met, in addition to the specific Cardiology requirements contained in this Manual. The standards contained in this Manual are the minimum requirements for the specialty of Cardiology. Any ACVIM-approved cardiology RTP may include additional requirements above the minimum required by this Manual. Those additional requirements then become part of that specific RTP. A resident in such an RTP must fulfill

all the additional requirements of that RTP, along with the minimum requirements in this Manual, in order to become an ACVIM Cardiology Diplomate, as those additional requirements are necessary for that resident to complete the RTP and obtain a residency certificate.

### **3.A ACCEPTABLE CARDIOLOGY RTPS**

A registry of the current ACVIM-approved cardiology RTPs, as evaluated by the CRTCC, is available on the [ACVIM website](#), or upon request from the [ACVIM office](#).

### **3.B CARDIOLOGY RTP REGISTRATION AND EVALUATION**

The ACVIM's policies, procedures, and criteria for RTP registration, annual re-approval, probation and termination are standardized across all ACVIM specialties and are described in the Certification Manual (sections 3.C.4-6).

### **3.C CARDIOLOGY CANDIDATE REGISTRATION**

The ACVIM's policies, procedures, and criteria for resident registration as an ACVIM Candidate in an ACVIM-approved RTP are standardized across all ACVIM specialties and are described in the Certification Manual (sections 3.C.3).

### **3.D GENERAL OBJECTIVES OF THE CARDIOLOGY RTP**

The cardiology RTP will provide intensive training in clinical cardiology, including major responsibility for the care of patients with cardiovascular disease. An RTP will place lesser emphasis on training in internal medicine, which may be completed by having residents participate in primary patient care, attend internal medicine rounds, and/or attend medical conferences in internal medicine.

Cardiology residents will acquire broad working knowledge of the anatomy, physiology, and pathology of all body systems, and in-depth knowledge of the cardiovascular system in health and disease. Although clinical training in most cardiology RTPs is likely to emphasize small animal practice, knowledge of comparative cardiology across species is an expected outcome of every cardiology RTP.

During the cardiology RTP, residents will obtain knowledge and understanding of the following areas:

- General internal medicine.
- Physical and laboratory diagnosis, management, and prognosis of cardiovascular disease of all domestic animals.
- Basic sciences of the cardiovascular system that relate to clinical cardiology, including macroscopic and microscopic anatomy, macroscopic and microscopic pathology, biochemistry, genetics/molecular biology, physiology/pathophysiology, and pharmacology/drug therapy.
- Recording and interpreting specialized cardiac diagnostic studies used in cardiovascular disease evaluation, including:

- Electrophysiological studies: interpretation of electrocardiograms (including loop recordings, Holter monitoring, and intracardiac recordings), and cardiac pacing (including pacemaker interrogation and programming).
- Cardiovascular sounds: auscultation and phonocardiography.
- Hemodynamics: cardiac catheterization techniques, interpretation of pressure tracings, indicator dilution studies, blood gases and oximetry, and calculation of shunt volumes/ratios based on these data.
- Cardiovascular radiography, CT, and cardiac MRI, including angiographic and other contrast studies.
- Echocardiography: all modalities.
- Nuclear cardiology: understanding the principles of radioisotope studies of perfusion, cardiac dynamics, and shunts.
- Interventional procedures: knowledge of the anatomy, techniques, indications, and risks of interventional procedures.

### **3.E SPECIFIC REQUIREMENTS FOR THE CARDIOLOGY RTP**

It is incumbent upon the SI, PD, RA, SDs, SSSDs, resident and Candidate, as well as relevant ACVIM staff and committee members, to be aware of the following RTP requirements, and to collectively work towards ensuring they are being fulfilled.

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#### ***3.E.1 DURATION OF CARDIOLOGY RTP TRAINING***

An ACVIM-approved cardiology RTP must be a minimum of 144 weeks. The minimum requirement for each RTP is 96 weeks of directly supervised intensive training in veterinary clinical cardiology. The remaining 48 weeks of the 144-week cardiology RTP will include a combination of additional directly supervised training in veterinary cardiology, directly supervised training by SSSDs in related disciplines, indirect supervision in veterinary cardiology or related disciplines, research and scholarly activity, study time, and vacation. If the resident is spending time with a physician cardiologist, up to 2 weeks can be logged as indirect or remote supervision as long the experience is discussed or reviewed with the RA or a SD.

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#### ***3.E.2 INTENSIVE CLINICAL TRAINING IN CARDIOLOGY***

The minimum requirement for each RTP is 96 weeks of intensive clinical training in veterinary cardiology under the direct supervision of a cardiology SD.

An ACVIM-approved cardiology RTP must provide residents with suitable clinical case experience to ensure clinical proficiency as a veterinary cardiologist, as well as with adequate practical experience in both invasive and noninvasive cardiac diagnostic and therapeutic techniques.

The number of cases seen during the RTP will vary among training sites. At all training sites, the majority of case material must emphasize cardiac disorders. Emphasis should be on quality rather than quantity, although a sufficient caseload must be available to provide experience with all types of cardiovascular disease in as many different species as possible.

Given a clinical case with cardiovascular disease, the resident should be able to evaluate the patient logically and skillfully. The resident should be able to perform the following tasks:

- Obtain and interpret the patient's history and conduct a complete physical and cardiovascular examination.
- Develop a differential diagnosis, including both etiologic and pathologic (anatomical and physiological) diagnoses.
- Suggest appropriate laboratory studies to confirm or rule out each possible diagnosis.
- Perform and interpret diagnostic studies.
- Make a presumptive or definitive diagnosis based on accumulated data.
- Outline and explain the rationale for appropriate treatment, including options and alternatives for therapy, and render a prognosis.
- Understand the principles of cardiovascular surgery and interventional cardiac catheterization (e.g., balloon valvuloplasty). (Basic knowledge of how to perform surgical and interventional procedures is considered essential; the ability to perform some but not all basic interventional procedures is also essential as per cardiovascular procedure guidelines (section 3.E.4) but true proficiency is not considered attainable in all programs unless additional training is undertaken. Understanding the indication for these procedures, how to monitor the progression of the disease if intervention is not yet indicated, when and where these procedures may be performed, and follow-up after completion of these procedures is essential even if proficiency is not attained in the performance of the particular procedure.)
- Communicate clearly to the client the diagnosis, prognosis, and recommended management of the patient's problem.

Residents will document this experience, including salient information about patients and procedures, by maintaining a log of echocardiograms and cardiovascular procedures they have performed using the currently approved forms. The log forms can be obtained from the [ACVIM website](#), or by requesting them in writing from the [ACVIM office](#). Residents will submit the logs to the cardiology CC annually and at the time of submitting credentials. Residents must use the most appropriate version of the log for each year's submission. Ideally, residents would use the most current format for submitting logs. However, residents may also use the template approved and in use at the beginning of their RTP. Residents must not use templates

that were outdated at the time of commencing their RTP. The use of outdated log forms will result in the rejection of the resident's log(s) by the cardiology CC and CRTC.

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### **3.E.3 ECHOCARDIOGRAMS**

The recording and interpretation of at least 500 echocardiograms, including M-mode, 2D and Doppler studies, is required during the cardiology RTP. A log of these echocardiograms must be maintained for annual evaluation and credentials purposes. The log forms can be obtained from the [ACVIM website](#), or by requesting them in writing from the [ACVIM office](#).

In addition to the detailed echocardiogram log, a log summary form must be submitted by the resident for annual evaluation and credentials purposes. The log summary form should indicate the type and number of all cardiovascular procedures performed. The log summary form is supplemental to the echocardiography, cardiac procedure, and education logs, and must be submitted annually in addition to those 3 logs. The summary form can be obtained from the [ACVIM website](#), or by requesting it in writing from the [ACVIM office](#).

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### **3.E.4 CARDIOVASCULAR PROCEDURES**

Performance of at least 15 supervised cardiovascular procedures is required during the cardiology RTP. This is the minimum number of acceptable cardiovascular procedures. True proficiency is likely to require more than this minimum standard. The resident must perform at least 12 of these 15 cardiovascular procedures at the SI. All 15 procedures must be performed under the direct supervision of a SD. The SD is expected to be physically present in the catheterization lab (may or may *not* be scrubbed in) for every procedure recorded in the resident's log. A log of these procedures must be maintained for annual evaluation and credentials purposes. The log forms can be obtained from the [ACVIM website](#), or by requesting them in writing from the [ACVIM office](#).

For these guidelines, cardiovascular procedures are defined as diagnostic cardiac catheterization and selective angiocardiography, balloon valvuloplasty, intravascular stenting, endomyocardial biopsy, permanent transvenous cardiac pacing, placement of Swan-Ganz catheters with subsequent hemodynamic monitoring, placement of intravascular/intracardiac occlusion devices, heartworm or intravascular foreign body extraction, transvenous electrical cardioversion of atrial fibrillation, invasive electrophysiological studies, and radiofrequency ablation.

No one procedure type can account for more than 6 of the 15 total cardiovascular procedures to fulfill this requirement. For example, a Candidate may implant more than 6 transvenous pacemakers during the RTP, but only 6 will count toward this requirement, and additional procedures of other types will be required.

Procedures that involve multiple techniques, such as diagnostic catheterization, selective angiography, and an intervention (e.g., balloon valvuloplasty or coil embolization) will be



counted in any 1 (but not more than 1) category. For example, a resident who performed 8 balloon valvuloplasties may count 6 of them as balloon valvuloplasties, and 2 as diagnostic catheterizations (which would represent the 8 procedures performed, 6 counted in 1 category and 2 in the second).

Other cardiovascular procedures may be acceptable for meeting this requirement, but such procedures must be approved in writing by the CRTC before being performed. The request for approval must be submitted to the CRTC at least 10 business days before the procedure is scheduled to be performed.

“Performance” of the required procedure is defined as the trainee’s active participation in the procedure. Observation of the required procedures is *not* adequate to fulfill the cardiovascular procedures requirements. The resident performing the procedure will also have primary case responsibility (“primary operator”) under the direct supervision of the SD responsible for the procedure. A secondary operator is a resident who actively participates in the procedure but does *not* meet the criteria listed above. A SD is expected to be physically present in the catheterization lab (may or may *not* be scrubbed in) for every procedure recorded in a resident’s log. The primary operator must be actively involved, with the SD’s guidance, in all of the following steps: pre-procedural case management, procedural planning, performance of technical manipulations during the procedure, and post-procedural case management. Both the primary and secondary operator may enter the procedure into their logs. When 2 residents (a primary and a secondary operator) perform 2 or more procedures, such as a coronary angiogram followed by a balloon valvuloplasty, in the same patient during the same session, each resident may enter a maximum of one procedure in their individual logs for that patient session.

The SD directly supervising a cardiovascular procedure, as defined above, will provide signed documentation of each procedure’s supervision.

As noted above, in addition to the detailed procedures log, a log summary form must be submitted by the resident for annual evaluation and credentials purposes. The log summary form should indicate the type and number of all cardiovascular procedures performed. The log summary form is supplemental to the echocardiography, cardiac procedure, and education logs, and must be submitted annually in addition to those 3 logs. The summary form can be also obtained from the [ACVIM website](#), or by requesting it in writing from the [ACVIM office](#).

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### ***3.E.5 SPECIAL CARDIOVASCULAR PROCEDURES***

Training in special cardiovascular procedures is also desirable, if facilities, equipment, and qualified personnel are available. For these guidelines, special cardiovascular procedures are defined as radionuclide angiography, CT angiography, MRI, digital subtraction angiography, and invasive electrophysiological testing. Clinical training in these special procedures may be accomplished through remote supervision. Theoretical training in the principles and application

of radionuclide angiography, CT angiography, MRI, digital subtraction angiography, and invasive electrophysiological testing can also be beneficial. Theoretical training may include remote training.

The SD directly supervising a cardiovascular procedure, as defined above, will provide signed documentation of each procedure's supervision. A log of these procedures must be maintained for annual evaluation and credentials purposes. The log forms can be obtained from the [ACVIM website](#), or by requesting them in writing from the [ACVIM office](#).

As noted above, in addition to the detailed procedures log, a log summary form must be submitted by the resident for annual evaluation and credentials purposes. The log summary form should indicate the type and number of all cardiovascular procedures performed. The log summary form is supplemental to the echocardiography, cardiac procedure, and education logs, and must be submitted annually in addition to those 3 logs. The summary form can be also obtained from the [ACVIM website](#), or by requesting it in writing from the [ACVIM office](#).

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### ***3.E.6 INTENSIVE CLINICAL TRAINING IN OTHER ACVIM AND NON-ACVIM SPECIALTIES***

Consultation with qualified veterinary specialists, in addition to cardiologists, is an important component of the cardiology RTP. The CRTC recommends that residents have the equivalent of a minimum of 2 weeks clinical training with a Board-certified specialist in each of the following: 1) internal medicine, 2) clinical pathology and/or anatomic pathology, 3) anesthesiology, and 4) advanced diagnostic imaging (e.g., CT, MRI, noncardiac ultrasonography, etc.). These recommended 8 weeks are *not* to be counted as part of the minimum of 144 weeks of directly supervised intensive clinical training in cardiology and are *not* to be drawn from weeks dedicated to examination study time, or vacation.

Telemedicine consultations are *not* considered adequate training for the cardiology resident in the specialties listed in the previous paragraph unless the consult includes a detailed and complete verbal discussion of the case between the mentor, resident, and radiologist or pathologist or another specialist giving the consult. The receipt of a written diagnostic imaging or pathology report via telemedicine is not considered adequate to meet the training requirements of a resident, and neither is an interaction conducted via email; there must be one-on-one interactive dialogue between the resident and the relevant consultant, adequate to meet the requirements of remote supervision as defined by the ACVIM.

The CRTC considers the availability of Board-certified specialists when evaluating cardiology RTP applications and renewals. A SI that trains cardiology residents should have access to other Board-certified specialists or have a plan to send the resident to secondary training sites to receive this training during the 3-year residency to improve the residents' general medical knowledge, to improve their ability to pass the ACVIM General Examination, and to improve their ability to manage cardiac cases that have problems with other body systems. The number

of rotations, beyond meeting the minimum requirements, will be determined by the PD and RA in concert with the CRTC based on the individual resident's background.

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### **3.E.7 RESEARCH AND SCHOLARLY ACTIVITY**

Residents are expected to participate in clinical or laboratory research projects, including playing a role in project design, execution, data analysis, evaluation, the presentation of results in a peer-reviewed setting (e.g., ACVIM Forum), and publication.

Proof of completion of this research requirement may include any of the following:

- Copy of a first author research paper published in a peer-reviewed journal, documenting original work undertaken predominantly during the RTP, or letter of acceptance (unconditional) of a first-author research paper from a peer-reviewed journal, documenting the same.
- Evidence of presentation of an abstract (oral or poster) at a scientific meeting, documenting original work undertaken predominantly during the RTP.
- Documented (letter from RA) completion of a prospective or retrospective research project, undertaken predominantly during the RTP, that is unpublished (e.g., thesis).
- Documented (letter from RA) submission of a prospective research grant/project, formulated predominantly during the RTP, pertinent to the Candidate's specialty.
- Documented (letter from RA and/or transcript) completion of 3 credits, or the equivalent, graduate course work in research methods, biostatistics, and/or research ethics.
- Documented (letter from RA and/or certificate) completion of a minimum of 25 hours of research-focused seminars or classes of an appropriately advanced level. These may be offered by the ACVIM, through online programs, or by other institutions.

These seminars or classes will cover subjects such as the following:

- Critical evaluation of the veterinary medical/biomedical literature.
- Grant writing.
- Study design and participation in clinical trials.
- Biostatistics.
- Research ethics.

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### **3.E.8 PUBLICATION REQUIREMENT**

There is currently no publication requirement for either cardiology RTPs or the process of becoming Board-certified as a Diplomate of the ACVIM in the specialty of cardiology, although a copy of a published research paper appearing in a peer-reviewed journal, or letter

of acceptance (unconditional) from a peer-reviewed journal, may provide evidence of fulfillment of the aforementioned research requirement (section 3.E.7).

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### **3.E.9 CARDIOLOGY JOURNAL CLUB**

Cardiology residents must participate in at least 80 hours of journal club throughout the RTP as stated in the Certification Manual.

Review and critical analysis of the cardiovascular literature is central to a journal club. The cardiovascular literature is broadly defined in the context of a journal club to include peer-reviewed medical, comparative, and veterinary journal articles in some way pertinent to the theory and practice of veterinary cardiology. The article(s) will have been distributed before the journal club session for review by participants.

At least 1 ACVIM Diplomate or ECVIM-CA Diplomate who is a cardiology RTP SD or SSSD in any ACVIM specialty must attend each journal club meeting. Residents must keep a log of journal club activities that includes the date, topics discussed, and those in attendance. The cardiology education log form can be obtained from the [ACVIM website](#), or by requesting it in writing from the [ACVIM office](#). The log is submitted as part of the credentials packet to be reviewed by the cardiology CC.

Cardiology journal clubs may be held remotely, according to the tenets of remote supervision as defined by the ACVIM, provided that there is an ACVIM Diplomate or ECVIM-CA Diplomate who is a cardiology RTP SD or SSSD in any ACVIM specialty present and participating in each remote journal club.

The cardiology journal club requirement is specific to the review of articles in scientific periodicals (journals); activities such as resident seminar series, local conferences, meetings, and the like are not considered part of the cardiology journal club.

The requirement for a minimum of 80 hours of cardiology journal club is in addition to the 150 hours of cardiology structured educational experiences as outlined below (section 3.E.10).

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### **3.E.10 CARDIOLOGY STRUCTURED EDUCATIONAL EXPERIENCES**

Residents must complete 150 hours of cardiology-related structured educational experiences throughout the cardiology RTP, which are in addition to the aforementioned required 80 hours of journal club (section 3.E.9). Case-specific discussions and daily case rounds undertaken during intensive clinical cardiology training do not count towards this RTP requirement.

It is anticipated that these structured educational experiences will primarily occur at the SI. Cardiology structured educational experiences may take many forms, including formal cardiology case conferences, internal medicine case conferences, grand rounds, cardiology conferences or seminars at medical schools and pediatric hospitals, journal club and book

reviews. Remotely delivered conferences, seminars and/or shared conferences between multiple institutions are acceptable in meeting this requirement. The availability and structure of these structured educational experiences will be considered by the CRTC during both the initial review of the RTP application and at each annual renewal. Cardiology residents must keep a log of structured educational experiences that includes the date, experience undertaken, and those in attendance. The cardiology education log form can be obtained from the [ACVIM website](#), or by requesting it in writing from the [ACVIM office](#).

Acceptable cardiology structured educational experiences include, but are not limited to, the following:

### *FORMAL TOPIC, TEXTBOOK REVIEW AND EXAMINATION PREPARATION SESSIONS*

A cardiology RTP may provide intensive review sessions or courses for residents on topics covered in the General Examination and cardiology Specialty Examination.

When given at the SI, lectures, topic review sessions, textbook chapter reviews, and cardiology journal clubs, given by the RTP's SDs or SSSDs may be counted toward this RTP requirement for up to a maximum of 3 hours (total daily maximum) in 1 day.

### *JOURNAL CLUBS*

Review and critical analysis of the cardiovascular literature is central to a journal club. The veterinary cardiovascular literature is broadly defined in the context of a journal club to include peer-reviewed medical, comparative, and veterinary journal articles in some way pertinent to the theory and practice of veterinary cardiology. The article(s) will have been distributed before the journal club session for review by participants.

At least 1 ACVIM Diplomate or ECVIM-CA Diplomate who is a cardiology RTP SD or SSSD in any ACVIM specialty must attend each journal club meeting. Residents must keep a log of journal club activities that includes the date, topics discussed, and those in attendance. The cardiology education log form can be obtained from the [ACVIM website](#), or by requesting it in writing from the [ACVIM office](#). The log is submitted as part of the credentials packet to be reviewed by the cardiology CC.

Journal clubs may be held remotely, provided that there is an ACVIM Diplomate or ECVIM-CA Diplomate who is a cardiology RTP SD or SSSD in any ACVIM specialty present in each remote meeting.

Additional journal club experiences contributing to the 150 hours of structured educational experiences are in addition to the 80 hours of journal club mandated in the general ACVIM guidelines and in (section [3.E.9](#)) above.

When given at the SI, lectures, journal clubs, and textbook chapter reviews given by the RTP's SDs or SSSDs may be counted toward this RTP requirement for up to a maximum of 3 hours (total daily maximum) in one day.

### *CARDIOLOGY FORMAL CASE CONFERENCES*

Formal case conferences provide a forum for thorough and detailed consideration of clinical cases. These structured activities emphasize pathophysiology, clinical presentations, interpretation of diagnostic studies, therapy, and outcome.

Rounds with residents and Candidates presiding over clinical cases do not meet the criteria for formal case conferences.

### *SEMINAR OR LECTURE SERIES*

Seminars or lectures in cardiology presented by ACVIM cardiology Diplomates, ECVIM-CA cardiology Diplomates, residents or Candidates provide an opportunity for in-depth investigation of cardiovascular topics.

### *UNIVERSITY CLASSES / GRADUATE COURSE WORK*

This is formal course work pertinent to the RTP in which a resident participates. If a resident enrolls in a course that has a direct relationship to cardiology practice or research, such as physiology, pathology, statistics, or other related fields, the resident may log the course as part of a cardiology educational experience. If a physician cardiologist or Cardiology Diplomate (ACVIM or ECVIM-CA) teaches a course, it can be used to fulfill the education requirements. If a course covers a cardiology topic, the resident may enter the full number of hours that the resident attends the course into their log. If the resident attends a class in a related field (e.g., statistics) and wants to use the class as cardiology educational experience for more than 10 hours per year, then the resident must submit a written description of the class to the CRTC along with the logs. If the CRTC rejects these hours, and if the SD or the resident disagrees with the CRTC's decision, then an appeal can be made to the ACVIM Appeals Committee.

### *ACVIM FORUM*

Attendance at 1 ACVIM forum is required during a cardiology RTP. Residents and mentors should note that attendance at conferences or meetings outside of the SI cannot fulfill greater than 10 hours per year of logged structured educational experiences.

### *ACVIM ADVANCED CONTINUING EDUCATION (ACE) COURSE*

Attendance at a cardiology-focused ACE course is not a requirement of a cardiology RTP but may be beneficial. Residents and mentors should note that attendance at a

continuing education conference outside the SI may *not* fulfill greater than 10 hours per year of logged structured educational experiences.

Residents may meet the requirement for cardiology structured educational experiences by means other than those described. However, the CRTC must approve any structured educational experiences in advance of the educational experience for it to count towards the resident's RTP requirements and certification process.

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### ***3.E.11 STUDY TIME***

The RTP determines the amount of time off to study for the General Examination and the cardiology Specialty Examination. The CRTC would generally like to see specific time earmarked for Candidates to study for both examinations, with representative examples being 4 weeks preparation time for the General Examination and 5 to 8 weeks preparation time for the cardiology Specialty Examination. Study time should be scheduled to immediately precede the examination dates as much as is practical.

It is expected that the cardiology resident develops a structured self-study program in consultation with the resident's RA. The cardiology Form Review / Examination Committee provides a comprehensive reading list, and this list should be reviewed at the start of the RTP. A self-study program should include standard texts in veterinary and human internal medicine and cardiology, cardiovascular anatomy, physiology, pharmacology, embryology, pathology, and appropriate current and past journal articles detailing veterinary and human cardiology.

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### ***3.E.12 VACATION AND PERSONAL TIME***

A resident should take vacation time during the cardiology RTP that is totally separate from other RTP activities and requirements. While the SI/RTP ultimately allocates vacation times for its residents, the CRTC recommends that a resident take at least 2 weeks of vacation per year of the RTP.

An RTP must also provide reasonable accommodation for a resident's medical needs (e.g., doctor's appointments, etc.).

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### ***3.E.13 RTP INTERRUPTION***

Training interruptions may be unavoidable in circumstances where a resident must switch from one RTP to another to fulfill all RTP and credentialing requirements. In such cases, the CRTC must approve the new RTP before the onset of clinical training, and the cardiology CC should be notified of the approved changes. In addition, the cardiology CC and CRTC must each verify which portions of the training at the original RTP will be accepted as fulfilling credentialing requirements. If a resident has been placed on probation at one training site and is accepted into an RTP at another institution (non-traditional program), the time on probation

can only be counted toward the cumulative training requirements with the consent of the PD at the site that implemented probation for the resident. All such requests for approval of prior training must be reviewed and approved by both the cardiology CC and the CRTC.

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### **3.E.14 RTP VARIANCES**

Variations to cardiology RTPs may be permitted by the CRTC, but a request for a variance will require a detailed explanation from the PD to the CRTC, and written permission from the CRTC must be granted. In general, such approval will relate to combined residency-graduate degree programs or RTPs that include significant resident research commitments. Variations must be approved by the CRTC before the resident includes them as part of the RTP. Documentation relating to approved variations must be included with the Candidate's credentials packet.

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### **3.E.15 ONLINE RTP EXIT SURVEY**

Within 90 days of completing a cardiology RTP, residents are strongly encouraged to complete an online survey regarding the quality of their RTP experience.

Responses are shared with the appropriate PD to provide important feedback regarding their RTP. Data, held strictly confidential, will be published as a 5-year rolling average score per surveyed category calculated for each RTP, and will be released every 3 years to ensure the anonymity of Candidates who completed smaller RTPs.

## **4 ROLES AND RESPONSIBILITIES ASSOCIATED WITH CARDIOLOGY CANDIDACY AND RTPS**

These descriptions expand upon those required and discussed in the Certification Manual, as they pertain specifically to the specialty of cardiology.

### **4.A RESPONSIBILITIES OF THE SPONSORING INSTITUTION**

The SI for a cardiology RTP, in partnership with the PD, RA, SD and SSSDs, must ensure a healthy and safe learning and working environment that promotes the resident's professional advancement, as well as psychological, emotional, and physical well-being. The SI must ensure the availability of all necessary professional, technical, and clerical personnel to best support the cardiology RTP.

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#### **4.A.1 SUPERVISION**

To host an ACVIM-approved cardiology RTP, the SI must be a veterinary medical facility with a minimum of 1 ACVIM cardiology Diplomate(s), and/or ECVIM-CA cardiology Diplomate(s), and an engaged faculty and staff active in a variety of disciplines and veterinary specialties. The CRTC prefers that a Board-certified internist, clinical pathologist and/or anatomic pathologist, anesthesiologist, radiologist, and surgeon be located at the SI; however, it is not required.



Training that is *not* under the direct or indirect supervision of an ACVIM or ECVIM-CA Diplomate in cardiology must be detailed in the individual resident's application and approved by the CRTC in advance of the start of the resident's RTP.

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#### **4.A.2 FACILITIES AND EQUIPMENT**

The SI for an ACVIM-approved cardiology RTP must have on-site radiography, electrocardiography, angiocardiology, cardiac catheterization and invasive pressure monitoring. This essential equipment must be available and functioning at all times. If an SI fails to obtain a repair, or replacement, for nonfunctioning, or unavailable, essential equipment for 2 months or more in a calendar year, the RTP will be placed on probation. If there are multiple persistent equipment issues at an RTP, the RTP may be immediately terminated.

Availability of facilities for other studies, including intracardiac electrophysiology, CT angiography, MRI, and nuclear medicine, is desirable.

Additional diagnostic equipment and facilities must include access to laboratories for clinical pathology, and anatomic pathology (both gross and microscopic), microbiology and parasitology.

Patient care facilities at the SI should be sufficient to allow for outpatient, in-hospital, and intensive patient care.

As per the Certification Manual, physical and/or electronic library facilities that provide access to textbooks and journals in both human and veterinary medicine are mandatory.

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#### **4.A.3 DIDACTIC LEARNING OPPORTUNITIES**

The SI for a cardiology RTP must commit to providing the resident with the required didactic learning opportunities.

### **4.B RESPONSIBILITIES OF SECONDARY TRAINING SITES**

A secondary training site is any training site that is *not* the SI. Secondary training sites may be utilized to meet both required cardiology RTP clinical training and didactic educational experiences and/or to supplement those.

If a secondary training site is used to fulfill a portion of the requirement for direct supervision in intensive clinical cardiology, or to complete any of the required echocardiography or cardiovascular procedures, the SD at the secondary site must complete a [Cardiology Training Agreement Form](#). This form must be submitted online to and approved by the CRTC along with the RTP application and/or annual renewal. The Cardiology Training Agreement Form will indicate clearly the scope and duration of the proposed training and the specific (single) trainee to which the particular agreement pertains. The SD at the secondary site(s) must be ACVIM Cardiology Diplomate and member, or ECVIM-CA Diplomate, in good standing, and must commit to providing direct supervision. Upon completion of the

proposed training, the original Cardiology Training Agreement Form must be updated to describe the actual time spent with the resident and the procedures performed. The SD at the secondary site must sign all appropriate resident logs. No more than 4 of the required 24 months of direct supervision in intensive clinical training in cardiology can be accrued at secondary training sites.

Additional secondary site cardiology training experiences that are not used to fulfill a portion of the required direct supervision in intensive clinical cardiology, or to complete any of the required echocardiography or cardiovascular procedures, do not require completion of the Cardiology Training Agreement Form. Brief descriptions of these experiences should be listed in the RTP application and annual renewal.

If an RTP plans to provide training in internal medicine, clinical pathology, anatomic pathology, anesthesiology, advanced diagnostic imaging, and/or direct supervision by other ACVIM specialties at secondary training sites, i.e., locations other than the SI, the PD must provide letters of commitment from the secondary training site SSSDs to the CRTC. If the PD, RA, and/or CRTC deems it necessary to require 1 or more rotations under the direct supervision of specialists not available at the SI (e.g., internist, radiologist, anesthesiologist, and pathologist), then an outside rotation needs to be included in the RTP description to satisfy the requirement. During this time, direct supervision by another specialist is required and must be documented in writing as having been completed.

Updated letters of commitment must be submitted at the annual renewal of an existing program. Additional information about secondary training sites is found in the Certification Manual.

#### **4.C RESPONSIBILITIES OF THE PROGRAM DIRECTOR (PD)**

As defined in this manual, a cardiology program director (PD) is the individual at the SI who assumes overall responsibility for the conduct and integrity of that institution's RTP(s). Unlike some specialties, the specialty of cardiology requires that a cardiology PD must be an ACVIM Diplomate in the specialty of cardiology, or an ECVIM-CA Diplomate in the specialty of cardiology. If the PD is an ECVIM-CA cardiology Diplomate, that individual must be part of an RTP located in the United States or Canada.

As outlined in Certification Manual, the PD is responsible for ensuring that substantive changes within a cardiology RTP affecting compliance with cardiology specialty RTP requirements are reported to the CRTC for approval before implementing the changes. Substantive changes include, but are not limited to, the following:

- Alteration of program duration or resources, such as addition or removal of a secondary practice location (any such change would require RTC approval before the resident participates in any added locations).
- Change of RAs who are cardiology Diplomates of the ACVIM or ECVIM-CA.
- Change of SDs who are cardiology Diplomates of the ACVIM or ECVIM-CA, or changes in their reported contact hours with residents.

- Any change in a resident's status (e.g., the resident is placed on probation).
- Addition or removal of resident (e.g., dismissal or withdrawal of a resident).
- Resident switching to or from a dual board program (this includes non-ACVIM residencies, e.g., the American College of Veterinary Emergency and Critical Care).
- Resident enrolling in an institutional graduate program.

Reporting inaccuracy may result in cardiology RTP probation or termination.

If a PD leaves the RTP, the SI must notify the CRTC of the proposed change in PD at least 7 days before the change occurs. Failure to do so will result in the RTP being placed on probation. Failure to respond satisfactorily to CRTC requests for relevant information, within 30 days, will result in the CRTC recommending RTP termination. Time served by residents in an unapproved or terminated RTP will not count toward the completion of a cardiology RTP or certification requirements.

#### 4.D RESPONSIBILITIES OF THE RESIDENT ADVISOR (RA)

The cardiology resident advisor (RA) is the primary individual at the SI who monitors the cardiology resident's progress during residency training. A cardiology RA must be an ACVIM Diplomate in the specialty of cardiology or an ECVIM-CA Diplomate in the specialty of cardiology. If the RA is an ECVIM-CA Cardiology Diplomate, that individual must be part of an RTP located in the United States or Canada. The cardiology RA must also be actively involved as a SD for the assigned residents and be substantially involved in the clinical supervision of assigned residents.

As outlined in the Certification Manual, the RA must evaluate, in writing, an assigned resident at least semiannually and discuss the results of each evaluation with the resident. The resident must sign the RA's copy of the written evaluation to indicate that the resident has received a copy of the evaluation. The CRTC may request copies of these semiannual evaluations if there is a discrepancy between the Candidate's and the RA's records. The RA signs and verifies all documentation related to resident completion of RTP requirements.

#### 4.E RESPONSIBILITIES OF THE SUPERVISING DIPLOMATE (SD)

A cardiology supervising diplomate (SD) is an ACVIM Diplomate and member in the specialty of cardiology or an ECVIM-CA Diplomate in the specialty of cardiology, who is contributing to the clinical training and didactic education of the cardiology resident in the specialty of cardiology. Unlike some specialties, there may only be 1 Board-certified veterinary specialist in the specialty of cardiology with SD responsibility at the SI for a cardiology RTP to be approved and to maintain annual re-approval. Additional SDs and SSSDs may be located at secondary training sites.

It is the SD's primary responsibility to provide daily direct supervision of the resident when undertaking intensive clinical training in cardiology, and to participate in journal club and structured educational experiences with the resident.

The RTP must not have more than 2 cardiology residents per ACVIM cardiology Diplomate or ECVIM-CA cardiology Diplomate. If a SD leaves the RTP and the RTP has more than 2 residents per SD, the CRTC must be notified by the PD, and the RTP will be placed on probation until the RTP restores the minimum required resident to SD ratio.

A SD who comes to the SI on a part-time basis and provides direct supervision to a Candidate during that time must advise the CRTC of this in writing at least 10 business days before the intended start of the period of direct supervision. The RA is also responsible for notifying the RTC in writing, at least 10 business days before the intended start of the period of direct supervision, of the SD's role in the RTP. Both communications need to specify the start and end dates of the supervision and the number of complete training weeks that the visiting SD will directly supervise for which resident(s). Failure to meet these requirements will lead to the period of interaction between the visiting cardiologist and the resident not being approved or not being counted as direct supervision.

#### 4.F RESPONSIBILITIES OF THE RESIDENT

It is the responsibility of the resident to fulfill all the requirements of the specialty's RTP as outlined in this Manual, while adhering to the highest professional standards and the ACVIM's code of conduct.

#### 4.G RESPONSIBILITIES OF THE CANDIDATE

It is the responsibility of the Candidate to fulfill the requirements of the specialty's certification process as outlined in this Manual, while adhering to the highest professional standards and the ACVIM's Code of Conduct, in order to become a Diplomate of the ACVIM in the specialty of cardiology. The certification process includes, but is not limited to, fulfilling all the requirements of the specialty's RTP as outlined in this Manual.

Candidates can access this Manual, other relevant information, all relevant forms, and deadlines on the [ACVIM website](#), or request said information from the [ACVIM office](#).

It is the Candidate's responsibility to be aware of all certification and RTP requirements, other relevant information and deadlines. It is the Candidate's responsibility to maintain a record of all communications, receipts and essential documentation.

## 5 CLINICAL MILESTONES FOR CARDIOLOGY RESIDENTS

### 5.A CLINICAL MILESTONES FOR FIRST-YEAR CARDIOLOGY RESIDENTS

First-year residents should meet the following milestones to continue to the second year of their RTP:

- Register with the ACVIM within 90 days of beginning the RTP.
- Demonstrate competency, as determined by the RA, in cardiovascular examination and physical diagnosis.

- Demonstrate satisfactory progress in the program on semiannual written review of the resident by the RA.
- Complete 40 to 50 structured educational hours, realizing that 50 hours is the goal to achieve each year of residency for a total of 150 hours at the end of 3 years.
- Attend 25 to 27 hours of journal club (in addition to the structured educational hours above), realizing that 20 to 30 hours is the goal to achieve each year for a total of at least 80 hours at the end of 3 years.
- Perform two to five cardiovascular procedures. Relative to second- and third-year residents, first-year residents might not have the opportunity to perform as many procedures, which explains why this number is fairly low.
- Perform 100 to 150 echocardiograms in the first year. Because most first-year residents and Candidates are learning to do echocardiograms, this number is prorated to 50 to 100 echocardiograms by the time of log submission on the date specified on the [ACVIM website](#).
- Determine with the RA a plan to achieve the research requirement as outlined in Part One of this document and above. This may consist of ideas for a research project and/or planned coursework to attend, depending on the option selected.

The CRTC considers extenuating circumstances on a case-by-case basis, provided the RA or the SD to whom the impacted resident is assigned submits a letter explaining the circumstances.

Because the CRTC reviews logs residents submitted by the dates specified on the [ACVIM website](#); a full year of work is not normally reviewed in a resident's first year; this will vary based on a resident's start date. Typically, a resident includes 7 to 8 months of first-year logs. Therefore, the number of items in the log is prorated for that amount of time.

## **5.B CLINICAL MILESTONES FOR SECOND- AND THIRD-YEAR CARDIOLOGY RESIDENTS**

Second-year residents should reach the following milestones to continue to the third year of their RTP:

- Demonstrate competency, as determined by the SD and the RA, in clinical cardiology; demonstrate satisfactory progress on the RA's annual review of the resident.
- Complete 100 educational hours cumulatively, realizing that 50 hours is the goal to achieve in each year of residency training, for an ideal total of 150 hours at the conclusion of 3 years.
- Attend 52 to 54 hours of journal club meetings cumulatively, realizing that 20 to 30 hours is the goal to achieve in each year to allow for a total of at least 80 hours at the end of 3 years.
- Perform additional cardiovascular procedures for a cumulative total of 6 to 10 procedures by the end of the second year of residency; roles as the primary or secondary operator.
- Perform additional echocardiograms for a cumulative total of 300 to 350 echocardiograms performed by the end of the second year of residency.

- Continue the plan developed to fulfill the research requirements. For example, completion of data collection in a research project or completion of coursework now or in the next 12 months.

## 6 RESIDENT AND CANDIDATE EVALUATION

Residents should receive a formal written evaluation from their RA at least semiannually. The evaluation may be completed using criteria developed by the SI, based upon the RTP requirements outlined in this Manual, as well as the aforementioned clinical milestone recommendations. The resident is to sign the RA's copy of the written evaluation to indicate that the resident has received a copy, and has reviewed it with the RA.

Consultation with the cardiology ombudsperson is recommended if a discrepancy exists among the PD, SD, RA, and resident as to the cause of a resident's unsatisfactory progress.

### 6.A RESIDENT LOGS

Cardiology residents and Candidates must keep logs of all echocardiograms, cardiovascular procedures, special cardiovascular procedures, and educational activities they complete.

Residents and Candidates must complete the following logs to verify their fulfillment of the cardiology RTP requirements:

- Echocardiography log.
- Cardiovascular procedures log.
- Education log.
- Resident log summary form.

Log completion begins with the start date of the resident in the RTP and continues throughout the RTP. Residents must use [the logs the ACVIM provides](#) to submit information to the CRTC, cardiology CC and to the ACVIM office. Residents should verify, before submission, that they are using the most appropriate logs (either the most current or the one in place at the start of their RTP).

Log entries must be typed in the proper format and signed by the PD, RA, SD(s) and/or SSSD(s) as instructed on the log forms. Residents submit completed logs online to the [ACVIM office](#) according to the timeline and by the deadlines defined on the [ACVIM website](#).

The exception is for the year before residents intend to take the cardiology Specialty Examination. In that circumstance, Candidates submit their credentials packet by the date specified on the [ACVIM website](#) in the year before they plan to take the cardiology Specialty Examination. At the time of that submission, residents submit a copy of all logs completed through the date specified on the [ACVIM website](#). They will submit their **final** log after completion of the residency (which will be after the examination). If a resident elects not to take the cardiology Specialty Examination during the last year

of residency, then the **final** log is to be submitted at the end of the residency according to the timeline defined on the [ACVIM website](#), which will be before their examination.

Periodically, the CRTC updates the log form templates. Residents must check the [ACVIM website](#) yearly and, where appropriate, adapt their logs accordingly for use moving forward. Ideally, residents use the most current format for submitting logs. They may also use the template in use at the beginning of their RTP. Residents may not use outdated templates, that is templates replaced before the start of their RTP.

Residents should also download and use in their log entries the [list of acceptable abbreviations](#) compiled by the CRTC.

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#### **6.A.1 CARDIOLOGY RESIDENCY TRAINING COMMITTEE (CRTC) LOG REVIEW**

The CRTC annually reviews first and second-year resident logs in every RTP and third and fourth-year logs in longer RTPs. The CRTC assesses the status and accomplishments of a resident or Candidate in the training program and considers the content of the resident logs in the annual review for program renewal. If satisfactory progress is not observed, the CRTC notifies and works with the PD and RA of the RTP to ascertain why performance is not satisfactory and what to do to rectify the situation. The CRTC may approve the program depending on the degree of concern and provided that the resident or Candidate and the PD give an adequate response regarding the deficiencies. If the deficiency in the progress of the resident or if the explanation provided is unsatisfactory, the CRTC may recommend a more intensive review of the RTP (e.g., an increase in the frequency of log submissions, submission of a scheduled plan for the remainder of the educational sessions for the residency, or a plan for additional outside rotations). After this more intensive review of the program, the CRTC may place the program on probation and provide guidance on how that program must proceed to regain reinstatement. Each resident is notified no later than 60 days after review of the logs regarding their acceptability.

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#### **6.A.2 CARDIOLOGY CREDENTIALS COMMITTEE LOG REVIEW**

During the credentials approval process, the cardiology CC reviews a resident's logs, after which the cardiology CC chair notifies individuals with any deficiencies in any area and indicates which action(s) the resident must take to remedy the deficiencies. After correcting the deficiencies, the resident submits a **final** log to cardiology CC for review and completion of verification. Once verified, the cardiology CC chair notifies the ACVIM office that the resident completed all requirements.

No Candidate can become a cardiology Diplomate of the ACVIM, even if the Candidate passes the General and cardiology Specialty Examinations, until the Candidate has completed all RTP and credentialing requirements.

## 7 THE ACVIM GENERAL EXAMINATION

All ACVIM Cardiology Candidates must pass the General Examination in order to be eligible to attain Diplomate status (Board-certification). Information about the General Examination is outlined in the ACVIM Certification Manual.

## 8 CARDIOLOGY CREDENTIALS

Credentials approval (or conditional approval of credentials) is a prerequisite for taking an ACVIM Specialty Examination, and for Board-certification.

### 8.A PROCEDURES FOR SUBMITTING CARDIOLOGY CREDENTIALS

**\*\*\*Always check the ACVIM website before credentials submission; this process is subject to change.\*\*\***

The information listed in this section provides an overview of the procedures for submitting credentials. Specific guidelines are in the applicable Cardiology credential information packet. Because application requirements change periodically, Candidates must be certain that they are using the most current application and credentials packet. If Candidates have any questions regarding the application process, they should request clarification in writing from the ACVIM office or from the Cardiology CC chair well before the submission deadline.

A Candidate who intends to take the Cardiology Specialty Examination must submit credentials for the Cardiology Specialty Examination so that the ACVIM office receives the credentials packet no later than the date specified on the ACVIM website in the year preceding that examination date. **THERE ARE NO EXCEPTIONS TO THIS DEADLINE. CREDENTIALS PACKETS MUST BE SUBMITTED ON OR BEFORE THE DUE DATE TO ALLOW ADEQUATE TIME FOR REVIEW BY THE CARDIOLOGY CC. CREDENTIALS PACKETS WILL NOT BE REVIEWED IF THE CREDENTIALS FEE HAS NOT BEEN PAID BEFORE THE SUBMISSION OF THE CREDENTIALS PACKET.**

Candidates may submit the completed credentials packet and credentials fee online to the ACVIM office following the completion of 108 weeks of the RTP. The cardiology CC only evaluates credentials packets for Candidates who have paid the credentials fee. Payment of the fee triggers a review of the submitted credentials packets for completeness and accuracy.

Each resident or Candidate is notified no later than 60 days after the submission deadline regarding the acceptability of the credentials packet as a prerequisite for the Cardiology Specialty Examination. All Candidates must submit the current standard Cardiology application form along with the other required documents.



The Candidate must meet or surpass the following RTP requirements toward receiving Board-certification in cardiology and these are to be documented in the logs included in the credentials packet:

- Complete 500 echocardiograms.
- Complete 15 catheterization procedures.
- Complete the research requirement.
- Complete 80 journal club hours (*not* included in the 150 hours of structured educational experiences).
- Complete 150 structured educational hours.

If the resident fails to fulfill, or surpass, these RTP requirements by the deadline date specified on the [ACVIM website](#) of the year they submit the credentials packet, the cardiology CC will identify the remaining deficiencies and the Candidate's credentials may only be conditionally approved. The cardiology CC will request that the Candidate resubmit the applicable logs after correcting the deficiencies for final approval before the resident can complete the RTP and become Board-certified. Once the cardiology CC has determined that all deficiencies have been addressed, the cardiology CC chair will notify the ACVIM office that the resident has completed all RTP requirements.

Failure to correct the deficiencies and have logs reviewed and approved by the cardiology CC will render the resident ineligible for Diplomate status. The resident is ineligible to receive Board-certification until all requirements are completed, even if that individual successfully passes the General and Specialty Examinations.

Inadequate attention to detail or fundamental errors or omissions may cause the entire credentials application to be rejected.

Documentation of receipt of the Candidate's credentials application, receipt of the paid fee, and documentation of credentials approval with the Candidate's unique identification number, must be maintained by the Candidate as part of their essential documentation.

Separate receipts for each ACVIM fee paid and application acknowledgement will be provided by the ACVIM and must be maintained by the Candidate as part of their essential documentation.

## 8.B CARDIOLOGY CREDENTIALS ITEMS TO BE SUBMITTED

**\*\*\*Always check the ACVIM website for the most up-to-date information before submission; this list is subject to change.\*\*\***

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### 8.B.1 APPLICATION FORM AND FEES PAID

The credentials application form must be completed and the associated fee paid online via the [Candidate's dashboard](#) by the deadline specified on the [ACVIM website](#).

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### **8.B.2 QUESTIONS**

Each resident must prepare and submit a set of questions that demonstrate the Candidate's knowledge of cardiovascular medicine and to demonstrate that individual's clarity of scientific communication. All questions must be typed in a standard word processing program. The questions and their correct answers must be referenced from the veterinary literature.

The directions for the formulation of these questions contained in the Guidelines for Cardiology Credentials are the most updated directions and supersede the following requirements for question preparation if a conflict exists between the two. The cardiology CC reviews and grades the set of questions submitted in each credentials packet based on an established rubric including quality of content, level of difficulty, references, and clarity of graphics. There is a pre-determined pass point out of 5 points that has been established in line with the grading rubric. A score of 0 to 5 will be assigned to the submitted questions. Candidates who submit credentials but fail to meet the pass point will be awarded a conditional approval of their credentials packet and will be permitted to sit the Specialty Exam. Candidates with a conditional approval will be required to resubmit their set of questions and meet the established pass point prior to achieving Board-certification.

The required materials that must be submitted with the credentials application include the following:

- Five multiple-choice questions that follow the American Board of Internal Medicine guidelines for writing examination questions. Questions must be from at least four of the subcategories designated by capital letters in the Cardiology Subject Category Study Outline. No more than two questions can address a single subcategory. The subject category and subcategory must be clearly indicated for each question.
- Three essay questions. The questions may relate to any 3 different categories in the Cardiology Subject Category Study Outline. The subject categories may include those addressed by the Candidate's multiple-choice questions. The subject category and subcategory must be clearly identified. A suitable answer must accompany each question. This answer must be referenced.
- Three high-quality, publishable electrocardiograms (ECGs), each of which allow a Candidate to evaluate it within 2 to 3 minutes. An ECG may be obtained from any species, other than humans. Questions and referenced answers regarding the interpretation of the ECG must accompany the submission. The ECGs should be submitted as high-quality digital images (dpi of 300 or higher is recommended). ECGs should be optimized for amplitude and paper speed where possible.

- Three questions with accompanying answers that require the interpretation of submitted graphic material, such as (but not limited to) radiographs, cardiac catheterization data, ultrasound exams, gross or microscopic pathology, or other special studies. These still graphics must be of publishable quality. Images should be 300 dpi or higher to ensure publishable quality. Images where color is important should be provided as color images. A single image sufficient to make a diagnosis is preferred. If a single image is insufficient to allow a diagnosis, then it is strongly recommended that each image submission consist of no more than two parts (i.e., image #1A and image #1B).
- A single high-quality (at least 300 dpi) digital video recording of an echocardiogram, angiogram, or other fluoroscopic procedure. This is to be accompanied by a description of the findings and an appropriate question regarding the submission with an accurate answer(s) to the question proposed. Multiple recordings are unacceptable for submission in this section; however, an edited compilation of several echocardiographic views from a single patient's examination contained in a single clip (i.e., a video montage) is acceptable. The Candidate should ensure that a diagnosis can be made using a single digital video loop. The image and diagnosis should be referenced as described above.
- A single case study with multiple high-quality images or videos, such that multiple questions and answers about the case can be developed. The ideal submitted case should have some complexity and should not be a "simple" case (e.g., a congenital case with more than one defect might be a possibility for submission).
  - The submitted case study would need to have a minimum of three of the diagnostic tests, but more than three of the following is acceptable and strongly encouraged. The three diagnostic tests can consist of a heart sound recording or phonocardiogram, ECG, thoracic radiographs, diagnostic echocardiogram (multiple loops and stills), angiogram, pressure tracings, or other forms of imaging or diagnostics (CT, MRI, oximetry, EP study). The Candidate should submit a minimum of three questions that can be answered from these case materials, including the diagnosis, and the answer to the questions should be referenced as described above.
- A letter signed by the Candidate's RA and the Candidate stating the Candidate did not have any direct help in preparing the questions must accompany the set of questions.

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### **8.B.3 LETTERS OF REFERENCE**

Three letters of reference from cardiology associates with whom the Candidate has worked during the cardiology RTP must be included in the cardiology credentials submission. At least 1 must be from either an ACVIM cardiology Diplomate and member or an ECVIM-CA cardiology Diplomate. It is preferred that a second reference also come from either an ACVIM cardiology Diplomate or an ECVIM-CA cardiology Diplomate, and the third from an ACVIM Diplomate in the specialty of small animal internal medicine and/or large animal internal medicine. Each letter of reference must be submitted as directed in the cardiology credentials packet.

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### **8.B.4 RESIDENT LOGS**

If the resident fails to fulfill, or surpass, all RTP requirements by the deadline date specified on the [ACVIM website](#) of the year they submit the credentials packet, the cardiology CC will identify the remaining deficiencies. The cardiology CC will request that the resident resubmit the applicable logs after correcting the deficiencies for final approval before the resident can complete the RTP. Once the cardiology CC has determined that all deficiencies have been addressed, the cardiology CC chair will notify the ACVIM office that the resident has completed all RTP requirements.

Candidates must submit their final, updated echocardiography log, cardiovascular procedures log, structured educational experience log, and a completed summary form to the ACVIM office as soon as they have addressed all deficiencies as identified by the cardiology CC. Finalized logs must be submitted and approved by the cardiology CC before the resident finishes the cardiology RTP. The resident is ineligible to receive Diplomate status (Board-certification) until all cardiology RTP and certification requirements are completed, all deficiencies identified by the cardiology CC addressed and all logs reviewed and approved by the cardiology CC, even if that individual successfully passes the General and Specialty Examinations.

## **9 CARDIOLOGY SPECIALTY EXAMINATION**

### **9.A CARDIOLOGY SPECIALTY EXAMINATION REGISTRATION AND FEE**

Once credentials are approved, Candidates may register for the Cardiology Specialty Examination and pay the Specialty Examination fee online by the date specified on the [ACVIM website](#) of the year preceding the examination date. Late registration and fee payment will result in the Candidate being unable to sit for the examination that year. Also, see the Certification Manual for procedures common to all Candidates.

**Documentation of receipt of the Candidate's Cardiology Specialty Examination registration, receipt of the paid fee, and documentation of credentials approval, with the Candidate's unique identification number, must be maintained by the Candidate as part of their essential documentation.**

Separate receipts for each ACVIM fee paid and registration acknowledgement will be provided by the ACVIM and must be maintained by the Candidate as part of their essential documentation.

## 9.B CARDIOLOGY SPECIALTY EXAMINATION CONTENT AND FORMAT

**\*\*\*Always check the Candidates' exam webpage(s) on the ACVIM website for the most up-to-date information pertaining to ACVIM Examinations. Examination format/design, item types and standard setting/cut score determination method(s) are subject to change, as necessary to continue to align the examination with best practice and accreditation industry standards. Any changes will be reflected in the current examination blueprint and/or information provided to Candidates.\*\*\***

A [blueprint on the cardiology Specialty Examination](#) is posted on the ACVIM website at least 60 days before the examination date.

## 10 CORRESPONDENCE, INQUIRIES, ISSUES AND COMPLAINTS

Residents and/or Candidates with queries and/or complaints regarding RTP noncompliance, especially concerns that are not sufficiently resolved by the RTP's PD, should direct concerns in writing to the [cardiology ombudsperson](#) and/or to the current CRTC chair. Residents can obtain the names and contact information of these individuals from the [ACVIM office](#) or [ACVIM website](#). A response to the query and/or complaint can be expected within 4 weeks. Assistance from the cardiology ombudsperson can also be sought for situations that are difficult to resolve. The cardiology ombudsperson can be contacted directly by email at [CardiologyOmbuds@ACVIM.org](mailto:CardiologyOmbuds@ACVIM.org). The ACVIM can only address matters related to adherence to this Manual's requirements. Personnel matters are unique to each SI and its human resources policies and procedures and are not subject to ACVIM review.

## 11 MAINTENANCE OF CREDENTIALS (MOC)

As discussed in the Certification Manual every Diplomate who completed credentials and became a Diplomate on, or after, January 1, 2016, is awarded a Diplomate certificate that is valid for 10 years. These ACVIM cardiology Diplomates are subject to MOC. The MOC requirements are posted on the [ACVIM website](#). The [cardiology maintenance of credentials committee \(CMOC\)](#) maintains a [list of acceptable continuing education experiences](#) and their associated points that count toward the renewal of cardiology credentials by the ACVIM. This information is available on the [ACVIM website](#), or by request from the [ACVIM office](#). It is the responsibility of each ACVIM cardiology Diplomate to maintain documentation of these activities.

## APPENDIX A: IMPORTANT DEFINITIONS

### CARDIOLOGY CREDENTIALS COMMITTEE (CARDIOLOGY CC)

The cardiology CC evaluates a cardiology Candidate's progress during the ACVIM certification candidacy period, including completion of RTP requirements, General and Specialty Examination results, and fulfillment of any additional credentials requirements, such as the resident's echocardiography, procedures and structured educational experiences logs. The cardiology CC is responsible for reviewing and grading the cardiology Candidate's credentials packet and certifying that a Candidate meets all the requirements for becoming a Diplomate of the ACVIM in cardiology.

### CARDIOLOGY OMBUDSPERSON

The [cardiology ombudsperson](#) is an individual appointed by the specialty president. This individual is available to Candidates and serves as a liaison during conflicts between a Candidate and either an RTP or the ACVIM. The cardiology ombudsperson provides a neutral and confidential environment in which to voice concerns. The cardiology ombudsperson advises and offers options toward resolution of a problem as deemed appropriate, should any arise, between residents in training and either their institutional training programs officers, supervisors, or directors or with the ACVIM as an organization. All communications are held in strict confidence. The scope of the cardiology ombudsperson's work excludes matters relating to examinations and/or denial of credentials, which are addressed by the Appeals Committee. The cardiology ombudsperson does not engage in any arbitration process, does not offer legal advice, and does not impose sanctions on individual Candidates or RTPs. If the cardiology ombudsperson is personally involved in a dispute with a Candidate, the ombudsperson must recuse themselves. In such a case, the ACVIM certification liaison will serve as the cardiology ombudsperson during that dispute. The cardiology ombudsperson may be contacted at [CardiologyOmbuds@acvim.org](mailto:CardiologyOmbuds@acvim.org). All communications are held in strict confidence.

### CARDIOLOGY PROGRAM DIRECTOR (PD)

The cardiology program director (PD) is the individual at the SI who assumes overall responsibility for the conduct and integrity of that institution's RTP(s). Unlike some specialties, the specialty of cardiology requires that a cardiology PD must be an ACVIM Diplomate and member in the specialty of cardiology, or an ECVIM-CA Diplomate in the specialty of cardiology. If the PD is an ECVIM-CA Cardiology Diplomate, that individual must be part of an RTP located in the United States or Canada.

### CARDIOLOGY RESIDENCY TRAINING COMMITTEE (RTC)

The cardiology residency training committee (CRTC) specifies the residency training criteria that must be met for certification. The CRTC reviews and approves all new RTPs. The CRTC reviews and approves for renewal each registered RTP annually. The CRTC also reviews any significant changes in an RTP (e.g., change in PD or RA, a resident or Candidate's early termination or failure to complete an RTP, alterations in program duration or content, and locations of secondary training sites) and notifies the cardiology CC of the approved changes. These reviews are normally based on documents submitted by the PD; however, if

questions arise, the CRTC may solicit supplemental documentation from other individuals who have knowledge of a particular RTC. The CRTC also handles questions from the residents and Candidates or PDs regarding the interpretation of the RTP guidelines.

### CARDIOLOGY RESIDENT ADVISOR (RA)

The cardiology resident advisor (RA) is the primary individual at the SI who monitors the cardiology resident's progress during residency training. A cardiology RA must be an ACVIM Diplomate and member in the specialty of cardiology or an ECVIM-CA Diplomate in the specialty of cardiology. If the RA is an ECVIM-CA Cardiology Diplomate, that individual must be part of an RTP located in the United States or Canada. A cardiology RA must also be actively involved as a SD for the assigned residents and be substantially involved in the clinical supervision of assigned residents.

### CARDIOLOGY SECONDARY-SPECIALTY SUPERVISING DIPLOMATES (SSSDs)

A secondary-specialty supervising diplomate (SSSD) for a cardiology RTP must be a Board-certified veterinary specialist in any specialty other than cardiology, who is contributing to the clinical training and didactic education of the cardiology resident in any specialty other than cardiology. Here Board-certified may refer to any veterinary specialists certified by an ABVS or EBVS registered veterinary specialty or registered veterinary specialty organization. The Board-certified veterinary specialist must be a Diplomate, and where relevant member, in good standing with the relevant ABVS or EBVS registered veterinary specialty or registered veterinary specialty organization.

### CARDIOLOGY SUPERVISING DIPLOMATE (SD)

A cardiology supervising diplomate (SD) must be a Board-certified veterinary specialist in the specialty of cardiology, who is contributing to the clinical training and didactic education of the cardiology resident in the specialty of cardiology. Here, Board-certified refers to either ACVIM cardiology Diplomates and members, or ECVIM-CA cardiology Diplomates. The ACVIM cardiology Diplomate and member, or ECVIM-CA cardiology Diplomate, must be in good standing with the ACVIM or ECVIM-CA, respectively. Unlike some specialties, the specialty of cardiology allows for only 1 Board-certified veterinary cardiologist with SD responsibility at the SI for a cardiology RTP to be approved and to maintain annual re-approval.

### NON-TRADITIONAL TRAINING IN CARDIOLOGY

A non-traditional cardiology RTP is a program that is approved by the CRTC and that is intentionally non-continuous. A non-traditional RTP may be a maximum of 5 years in duration. The cardiology specialty stipulates that in a non-traditional residency, all the specialty's requirements for residency training must be met, and that all training must take place within clearly defined, continuous blocks of training time. The CRTC must approve the RTP before the resident or Candidate commences the RTP.

## SUPERVISION OF RESIDENCY TRAINING

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### *DIRECT SUPERVISION*

Direct supervision is defined as having the SD or SSSD and resident participating in clinical practice together, wherein both the SD or SSSD and the resident are on the clinic floor, interactively and concurrently managing cases. The SD or SSSD need not personally examine each patient seen by the resident, but must review the case with the resident, and must remain physically available on-site for face-to-face consultation with the resident throughout the day.

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### *INDIRECT SUPERVISION*

Indirect supervision refers to circumstances wherein the SD or SSSD and resident, although participating in a clinical practice together, are *not* on the clinic floor simultaneously and are not concurrently managing cases (e.g., “chief weeks”). Indirect supervision does, however, imply a level of interactive case management, wherein the SD or SSSD must be immediately available for consultation and direct supervision when needed by the resident. Moreover, the specialty of cardiology specifies that to qualify as indirect supervision, the SD or SSSD is required to be on-site and have face-to-face contact with the resident for at least 1 hour per day for the entire week.

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### *REMOTE SUPERVISION*

Remote supervision is the use of technology, such as tele- or videoconferencing (e.g., Zoom, MS Teams, Skype, etc.) to facilitate some level of interactive resident supervision. It is most suited to interactive rounds, journal club, and seminars, but may be utilized on a limited basis to contribute to additional residency training requirements. The key component of remote supervision, as defined by the ACVIM, is it involves interaction between the supervisor(s) and resident.

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### *REMOTE TRAINING / EDUCATIONAL EXPERIENCES*

Remote training is the use of technology, such as tele- or videoconferencing (e.g. Zoom, MS Teams, Skype) to facilitate some aspects of resident education and/or training. Remote training, as defined by the ACVIM, best applies to on-line classes, seminars and conferences, where there is minimal to no interaction. The type and extent of remote training must be defined in the RTP application and/or annual renewal.

## TRAINING TIMES / TRAINING WEEKS

A cardiology RTP must have a resident working at least 40 hours in 7 contiguous days for it to count as 1 week of an RTP. This time includes emergency duties and patient care on weekends. Four weeks constitutes 1 month of training.