

## ORIGINAL RESEARCH

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# Survey of factors affecting satisfaction and success of residents enrolled in European College of Veterinary Diagnostic Imaging (ECVDI) residency programs

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## Abstract

Several published studies have described the success and satisfaction of residents enrolled in human radiology training programs, however comparable studies for veterinary radiology residents are currently lacking. The purpose of this descriptive, survey study was to evaluate resident perceptions of the European College of Veterinary Diagnostic Imaging (ECVDI) residency training programs. A web-based survey was sent to all listed 114 ECVDI residents and received a 57.0% response (65/114). Of these, 88% of respondents enjoyed their training and 73.5% of finishing respondents agreed they felt ready to work as a veterinary radiologist. First-time pass rates for the theoretical and practical components of the board certifying examinations were >80%. Regarding research and exam preparation, 41.5% and 49.2% of respondents, respectively, did not feel they received appropriate guidance. Eleven percent of respondents felt a lack of mentoring and 7.7% reported not receiving annual appraisals. Findings from this study can be used as background for future studies on perceptions of ECVDI residents and ECVDI residency program directors and for future policy decisions regarding ECVDI residency training programs.

## KEYWORDS

questionnaire, radiology and well-being, training program

## 1 | INTRODUCTION

Veterinary radiology is a rapidly evolving specialty and there is a need for this to be mirrored in the training of its residents. Previously published studies have described the satisfaction, performance, and well-being of doctors in-training for the medical radiology specialty<sup>1–3</sup>; however, comparable studies are currently lacking for veterinary radiology residents. These types of studies could allow veterinary radiology residents to provide suggestions on how to improve the management

of their programs, departments, or the overall flow of the hospital. These reflections may also help to improve efficiency and time management, which subsequently may lead to higher case turnaround times and financial benefits.

A survey of 217 medical radiology residents in the United States found that 77.8% of respondents were satisfied with their training programs and that satisfaction was negatively associated with several factors including long work hours, and lack of personal study, teaching, and research opportunities.<sup>1</sup> Introduction of a reduced report turnaround time was found to have a negative effect on the perceived quality of education delivered by the programme<sup>2</sup> and one

**Abbreviations:** CiPs, Capabilities in Practice; ECVDI, European College of Veterinary Diagnostic Imaging; WPBS, Work Placed Based Assessments.

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survey found slightly more than half of all respondents described symptoms of emotional exhaustion at least weekly.<sup>3</sup> Two recent papers have reported the well-being among veterinary medical house officers (residents, interns, and fellows)<sup>4</sup> and the training satisfaction and well-being among veterinary anesthesia residents.<sup>5</sup> The first of these papers found that veterinary house officers experienced burnout characterized by emotional exhaustion, lack of personal accomplishment, anxiety, and depression. Other published studies have found that regular appraisals provide residents with the chance to get involved in their own learning and allow a degree of self-regulation.<sup>6</sup> Self-regulation, and the control it imparts, has been shown to aid in the learning process of adults.<sup>7</sup>

European veterinary radiology training programs must adhere to regulations issued by the European College of Veterinary Diagnostic Imaging (ECVDI) to obtain or maintain accreditation. Audits occur every 5 years to ensure guidelines set out in the ECVDI Bylaws 2021 are being implemented. These quality assurance measures oversee requirements such as caseload, number of faculty, number of supervised training and the facilities available but fail to take into account workplace well-being and satisfaction.<sup>8</sup> Following a search of the databases Pubmed, CAB Direct, and SCOUT (Royal Veterinary College), for the keywords “veterinary”, “residency”, “resident”, “training satisfaction”, “success”, “perception” and “well-being” on 01/08/2022, no resource was found in the veterinary literature on the satisfaction of veterinary radiology residents in regard to their training.

The objectives of this study were to describe ECVDI resident perceptions of the organization/structure of their residency training programs and determine whether there are discrepancies between individual programs.

## 2 | METHODS

The study was a descriptive, survey design. Ethical approval was granted by the Social Science Research Ethical Review Board at The Royal Veterinary College of London (URN SR2019-0322). In June 2019 an email with a link to a 39-item electronic web-based survey (Google Poll) was sent out to all listed 114 ECVDI residents and recently finished residents. Access to email addresses was authorized by the ECVDI administration. A reminder email was sent approximately four weeks after the initial survey request. In case additional information on the survey was required, the name and email address of one of the authors (J.M.) was included in the emails. Participation in the survey was voluntary and each survey was anonymous.

The survey included five main categories: (1) demographics, (2) institution and residency structure, (3) mentoring, support, and supervision, (4) satisfaction and overall feelings regarding the residency, and (5) success at the certifying examinations. Questions included both multiple-choice and free-text answer formats.

## 3 | RESULTS

### 3.1 | Demographics survey category

Of the 114 requests sent, 65 candidates responded (57% response rate). Of these, 59 (91%) were current residents and 6 (9%) had recently completed a residency. Nineteen (29%) respondents were in the first year of the residency, 18 (28%) respondents were in the second year, 16 (25%) respondents were in the third year, 4 (6%) respondents were in the fourth year, 1 (2%) respondent was in the fifth year and 6 (9%) were recently finished residents. Nine (14%) respondents were under 30 years old, 52 (80%) respondents were between 30 and 40 years old and 4 (6%) were between 40 and 50 years old. Forty-seven (72%) respondents were female and 18 (28%) were male.

### 3.2 | Other survey categories

Responses related to questions on the institutions and the residency structure are provided in Table 1. Responses related to questions on mentoring, support, and supervision are shown in Table 2. Responses related to questions on satisfaction and overall feelings regarding the residency are shown in Table 3. Responses relating to questions on examination success are shown in Table 4.

## 4 | DISCUSSION

Encouragingly, this study found that 87.7% of residents of the ECVDI training program enjoyed their training and 73.5% of finishing/recently finished respondents agreed or mostly agreed with the statement that they felt ready to work as a senior radiologist at the end of their residency. First-time pass rate for both the theoretical and practical components of the board certifying exams were above 80% indicating a high success rate for the training programs. However, this study also identified some important differences between resident perceptions for the individual ECVDI residency programs and between the residency programs and the requirements set out by the 2021 ECVDI Bylaws.<sup>9</sup>

The ECVDI Bylaws are the set of principles, rules, and guidelines used to dictate the daily functioning and to help reach the long-term goals, of the ECVDI. In order for a residency program to be accredited/reaccredited a list of requirements need to be fulfilled in order to standardize and keep all programs comparable.<sup>8</sup> Concerningly, 16.9% and 23.1% of residents gave a response of no/ mostly no when asked if off-clinic time was respected and whether they received feedback on important points on their reports, respectively. As required by the 2021 ECVDI Bylaws, rounds between the resident and the supervisor to review and discuss the interpretation of diagnostic studies, the accuracy of the written reports and case management should be held, preferably every day, or at a minimum twice a week.

**TABLE 1** Questions relating to the institution and residency program.

Question	Mean (min-max)
How many imaging residents work in your institution?	3.1 (1.0–9.0)
How many imaging seniors work in your institution?	3.0 (1.0–7.0)
How many residents are in clinic at the same time?	2.6 (1.0–6.0)
On average how many hours per day do you work when on clinics?	9.6 (8.0–12.0)
How many evenings a month are you on call?	5.4 (0.0–20.0)
How many evenings a month are the seniors on call?	5.3 (0.0–31.0)
How many seniors are on clinic at the same time?	1.8 (0.0–6.0)
	% (n)
Are the seniors keeping an eye on the administrative duties inherent to a residency program?	
Yes	53.8 (35/65)
No	46.2 (30/65)
Do you have an annual appraisal with a senior where your work and progress are discussed?	
Yes	92.3 (60/65)
No	7.7 (5/65)
If you do receive annual appraisals, do you find it constructive and helpful?	
Yes	80.0 (52/65)
No	20.0 (13/65)

Eleven percent of respondents felt a lack of mentoring from the seniors with 7.7% reporting they did not receive any form of annual appraisal to discuss progress. The 2021 ECVDI Bylaws state supervisors, preferably accompanied by the program director, should annually evaluate the resident's performance and progress. The supervisor must also ensure that the resident is receiving proper training and must act as a mentor, must annually monitor the resident's performance and progress, must be available at the request of the resident to supervise cases, and must help prepare for the theoretical and practical exam in the way of film readings, mocks, and known case sessions. However, the program director and the supervisor are ultimately responsible for his/her own training program and no structure is outlined by the bylaws on how to implement training or how to assess progress. Supervisors do not receive training on how to mentor postgraduate students nor how to modify their way of teaching for different learning styles.

The 2021 Clinical Radiology Speciality Training curriculum written by the Royal College of Radiology, provides an exhaustive list of Capabilities in Practice (CiPs), which are objectives the trainee has to achieve at critical progression points throughout the 5-year specialty training program. These CiPs are evidenced in the way of Work Placed Based Assessments (WPBS), supervisors' assessments, summative assessment, and the trainees' own self-assessments. These WPBS, among others, include multi-source feedback forms, mini-imaging interpretation exercises, and radiology-direct observation of procedural skills and the aim of these day-to-day formative assessments are to provide regular reflection and feedback to help identify areas of strength and weakness.<sup>10</sup> Implementation of a similar assess-

ment program in veterinary radiology may standardize the ECVDI residency programs and ensure all residents are receiving the same structure for their learning. Doctors in training are assigned not only a clinical supervisor but also an educational supervisor. Educational supervisors are appropriately trained and are responsible for the overall supervision and management of the educational process. Providing formal training to ECVDI supervisors or giving residents access to online structured training accredited by the ECVDI may remove some of the discrepancies in teaching highlighted by this study.

Regarding research and exam preparation, 41.5% and 49.2% of respondents, respectively, did not feel they received appropriate mentoring or guidance, and only 76.9% of respondents stated they received mock exams. As mentioned previously, the 2021 ECVDI Bylaws state the named supervisor must assist in the preparation of the theoretical and practical examination. For practical examination training, film readings, mock exams, and known case conferences are recommended. Eighty-five percent of radiology program directors in the medical field agreed it is important for residents to have mentors and 83.6% agreed that a mentorship program had the potential to increase the number of residents pursuing academic careers or positions of leadership.<sup>11</sup> The increased workload and the large discrepancy between the incomes of academic and private practice radiologists are making an impact on young medical radiologists' decisions in choosing between private practice and academic careers.<sup>12</sup> The recruitment and retention challenges faced by the radiology departments in academic centers are not unique to human medicine and academia in the veterinary field is increasingly struggling to encourage radiologists into a university

**TABLE 2** Questions relating to mentoring, support, and supervision.

Question	% (n)
When on call are you backed up by a senior?	
Yes	32.3 (21/65)
Sometimes	32.3 (21/65)
No	35.4 (23/65)
Do you receive help and support from your co-residents?	
Yes	69.2 (45/65)
Sometimes	12.3 (8/65)
No	6.2 (4/65)
No co-resident	12.3 (8/65)
When in clinic, are the seniors easily approachable/contactable by the residents?	
Yes	46.2 (30/65)
Mostly yes	40.0 (26/65)
Mostly no	13.8 (9/65)
No	0.0 (0/65)
Is your off-clinic time respected?	
Yes	41.5 (27/65)
Mostly Yes	41.5 (27/65)
Mostly No	7.7 (5/65)
No	9.2 (6/65)
Overall, do you feel the seniors are mentoring you?	
Yes	30.8 (20/65)
Mostly Yes	36.9 (24/65)
Mostly No	21.5 (14/65)
No	10.8 (7/65)
Do you feel appropriately mentored as regards your research projects and paper writing?	
Yes	58.5 (38/65)
No	41.5 (27/65)
Do you feel the seniors have given you enough advice and guidance on what and how to study for exam preparation?	
Yes	50.8 (33/65)
No	49.2 (32/65)
Do you receive mock exams from your seniors?	
Yes	76.9 (50/65)
No	23.1 (15/65)
Do you have someone in your institution to turn to if you feel the need to?	
Yes	78.5 (51/65)
No	21.5 (14/65)
When on clinic, are the seniors actively participating in clinical imaging work	
Yes	49.2 (32/65)
Mostly Yes	32.3 (21/65)
Mostly No	15.4 (10/65)
No	3.1 (2/65)

(Continues)

**TABLE 2** (Continued)

Question	% (n)
When on clinic are the seniors available to the other clinicians for advice?	
Yes	41.5 (27/65)
Mostly Yes	44.6 (29/65)
Mostly No	13.8 (9/65)
No	0.0 (0/65)
Do the seniors organise/participate in rounds?	
Yes	30.8 (20/65)
Mostly Yes	41.5 (27/65)
Mostly No	26.2 (17/65)
No	1.5 (1/65)
Is the senior watching US examinations or quickly re-scanning the patient after the residents?	
Yes	9.2 (6/65)
Mostly Yes	29.2 (19/65)
Mostly No	36.9 (24/65)
No	24.6 (16/65)
Is a senior or a supervised resident checking the CTs and MRIs as they are acquired?	
Yes	30.8 (20/65)
Mostly Yes	46.2 (30/65)
Mostly No	15.4 (10/65)
No	7.7 (5/65)
Do you receive feedback on important points of your reports?	
Yes	29.2 (19/65)
Mostly Yes	47.7 (31/65)
Mostly No	18.5 (12/65)
No	4.6 (3/65)
What type of feedback do you receive for your reports?	
Verbal	52.3 (34/65)
Written	6.2 (4/65)
Written and verbal	41.5 (27/65)

setting.<sup>13</sup> The 2015 ACVR Job Analysis Survey found that between 2005 and 2015, the percentage of veterinary radiologists in private practice had increased from 49% to 59%, while the number of radiologists employed by universities had decreased from 47% to 33%.<sup>14</sup> Along with the staffing issues in academia, this trend could also bring about a reduction in the output of research and undergraduate training by specialists. In a paper published in 2015 by Jelinski and Silver, the most influential factors in the decision for veterinary radiologists to leave academia were remuneration (wages and benefits), lack of interest/enjoyment in research, geographical location, and family considerations.<sup>13</sup> Encouragingly, 72.3% of respondents reported that seniors did or mostly did organize or participate in rounds, however, when asked if they received on-call backup, 35.4%, 32.3%, and 32.3% of residents responded No, Sometimes, and Yes, respectively. Subdividing

**TABLE 3** Questions relating to the satisfaction and feelings towards the residency.

Question	% (n)
Overall do/did you enjoy your residency?	
Yes	41.5 (27/65)
Mostly Yes	46.2 (30/65)
Mostly No	10.8 (7/65)
No	1.5 (1/65)
For the finishing/recently finished residents, do you feel you are/were ready to work as a senior radiologist at the end of your residency?	
Yes	17.6 (6/34)
Mostly Yes	55.9 (19/34)
Mostly No	26.5 (9/34)
No	0.0 (0/34)
For the finishing/recently finished residents, if you do not feel you are/were ready to work as a senior radiologist at the end of your residency, do you feel the lack of mentoring is at least partly responsible for it?	
No	11 (1/9)
Yes	89 (8/9)
Do you feel stressed/under pressure at work?	
Yes	12.3 (8/65)
Mostly yes	21.5 (14/65)
Mostly no	63.1 (41/65)
No	3.1 (2/65)
Do you feel that your responsibilities at work are too heavy for your level of training?	
Yes	27.7 (18/65)
No	72.3 (47/65)

**TABLE 4** Questions relating to examination success.

Question	%
What is the pass rate at the first attempt at your institution over the last 3 years?	
Theoretical examination (%)	80.3
Practical examination (%)	87.0

the responses into what year of training the resident was in may have revealed a difference between senior backup of first-year residents compared to more senior residents. It is debatable whether backup is equally profitable to all residents when on call. One paper describes the challenges faced by internal medicine residents between balancing decision-making autonomy and the need to report to a supervising attending physician.<sup>15</sup> The Royal College of Radiologists offers guidance for on-call supervision of residents. Recommendations include that there must be a named consultant on-call covering the trainee and the level of consultant supervision should be the same as that provided during normal working hours and should be at a level appropriate for the stage of training of the individual trainee.<sup>16</sup>

The majority of respondents (78.5%) felt that if needed, they had someone in their institution to turn to. A survey of 654 radiologists in the medical field, evaluating work-related stress and associated medical conditions, found a negative association between the amount of social support received and levels of anxiety, depression, and any psychic disorders.<sup>17</sup> Providing a support network and recognition of mental well-being is currently not addressed in the ECVDI accreditation application or bylaws. A study looking into work-related burnout in medical radiology trainees reported residents were more likely to demonstrate high emotional exhaustion, high depersonalization, and high burnout level compared to internal medicine residents and suggested this could, in part, be due to the characteristics of individuals entering the field, the isolated nature of radiology and the stressors related to being a central service that supports many other departments.<sup>18</sup> Given the importance of mental wellness within the veterinary community, it could be proposed that future ECVDI accreditation guidelines include mandatory steps for the provision of a social support framework.

One of the limitations of the current study was that a pilot study was not performed. Pilot studies allow researchers to identify whether respondents understand the questions and instructions and whether the meaning of the questions is the same for all respondents.<sup>19</sup> When reviewing the data of the study, several unclear or poorly worded questions were noted. An example of this was "Are the seniors keeping an eye on the administrative duties inherent to a residency program?". It is unreasonable to expect residents to understand what administrative duties are involved in running a residency program and it is unlikely residents are aware of the time spent on this when supervisors are not on clinic. A pilot study may have identified these ambiguous questions or others that were open to interpretation, allowing us to omit or edit them.

Another limitation was that the response rate was low (57.0%). Results from a survey with a low response rate could be misleading and non-representative of the larger population.<sup>19</sup> Ideally response rates of 60% in patient satisfaction and 80% in epidemiological questionnaires are considered acceptable.<sup>20,21</sup> However, these are arbitrary values, and the acceptable response rate is dependent on the type of survey and would need analysis into the sources of response bias as well as consideration of the context in which the research has been carried out.<sup>21</sup> Unfortunately, the low response rate prevented statistical analysis from being performed on these data and may have led to skewed results, underrepresentative of the population. A low sample size allows for errors, including non-response/participation bias, where residents that are dissatisfied with their programs are more likely to spend time filling out the survey compared to those who are satisfied.<sup>22</sup> Unfortunately, this type of bias is hard to avoid but in order to reduce this we established a long data collection period and set out expectations in the email that accompanied the survey.

In conclusion, the results of this survey study were largely positive with 87.7% of ECVDI residents reporting to have enjoyed their residency and the majority of respondents feeling ready to work as veterinary radiologists at the end of their studies. However, study findings



also highlighted discrepancies in resident experiences across individual residency training programs, especially in the areas of mentoring and supervision. The authors propose that greater alignment with medical radiology training programs may aid in the reduction of these discrepancies and hope that this study may pave the way for future, more in-depth research.

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## LIST OF AUTHOR CONTRIBUTIONS

### Category 1

- Conception and design: Mortier
- Acquisition of data: Mortier, White
- Analysis and interpretation of data: Maddox, Mortier, White

### Category 2

- Drafting the article: White
- Revising article for intellectual content: Mortier, Maddox

### Category 3

- Final approval of the completed article: White, Mortier, Maddox

### Category 4

- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved: White, Mortier, Maddox

## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

## PREVIOUS PRESENTATION OR PUBLICATION

### DISCLOSURE

None.

## REPORTING CHECKLIST DISCLOSURE

The Good practice in the conduct and reporting of survey research resources found on the EQUATOR network (<http://www.equator-network.org/>) was used.

## DATA AVAILABILITY STATEMENT

The data produced by this study is available from the corresponding author upon reasonable request.

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