Title: Survey of factors affecting satisfaction and success of residents enrolled in European College of Veterinary Diagnostic Imaging (ECVDI®) residency programmes

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Abstract:

Although research into the success and satisfaction of human radiology training programmes is vast, similar research within the veterinary field remains limited. The purpose of this survey was to describe resident perceptions of the European College of Veterinary Diagnostic Imaging (ECVDI®) residency programme. The study design was observational and descriptive. A web-based survey was sent to all listed 114 ECVDI residents and received a 57.0% response rate (65/114). Eighty eight percent of respondents enjoyed their training and 73.5% of finishing respondents agreed they felt ready to work as a radiologist. First time pass rate for the theoretical and practical components of the board certifying examinations were >80%. Regarding research and exam preparation, 41.5% and 49.2% respondents, respectively, did not feel they received appropriate guidance. Eleven percent of respondents felt a complete lack of mentoring with 7.7% not receiving an annual appraisal. Although only providing a broad overview from a residents perspective, the hope is this study may lead the way for more in-depth research assessing the well-being of our residents.

**Introduction**

Veterinary radiology, as well as veterinary medicine as a whole, is constantly evolving and there is a need for this to be mirrored in the training of its residents. There is much research into the satisfaction, performance and well-being of doctors in-training in the human medical field. A survey 217 radiology residents in the United States found that 77.8% of respondents were satisfied with their training programmes and that satisfaction was negatively associated with several factors including long work hours, and lack of personal study, teaching and research opportunities1. Introduction of a reduced report turnaround time was found to have a negative effect on the perceived quality of education delivered by the programme2 and one survey found slightly more than half of all respondents described symptoms of emotional exhaustion at least weekly3. With the exception of a couple of recent paper assessing the wellbeing among veterinary medical house officers (residents, interns, and fellows)4 and the training satisfaction and well-being among veterinary anaesthesia residents5, literature on the satisfaction and well-being of veterinary residents is scarce. The forementioned paper found that veterinary house officers experience burnout characterized by emotional exhaustion, lack of personal accomplishment, anxiety and depression.

There are many advantages to discussing the experience of current and recently finished residents. Having recent first-hand insights, residents can provide suggestions on how to improve the management of their programmes, departments or even the overall flow of the hospital. These reflections may not only help future residents but could also improve efficiency and time management, which subsequently may lead to higher case turnaround times and financial benefits. Regular appraisals provide residents with the chance to get involved in their own learning and allows a degree of self-regulation6. Self-regulation, and the control it imparts, has been shown to aid in the learning process of adults7. The mental well-being of future residents and improving the experience of the residency programme is perhaps the most pertinent benefit to be gained from conducting satisfaction surveys. It is important not to repeat past failings and being transparent and highlighting areas where improvement can be made is an important first step. It is essential that we try to reduce the discrepancies, anecdotally reported, and aim to achieve a minimum standard between the individual residency programmes.

European radiology training programmes must adhere to regulations issued by the European College of Veterinary Diagnostic Imaging (ECVDI®) in order 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 case load, number of faculty, number of supervised training and the facilities available but fail to take into account workplace well-being and satisfaction8. Showcasing data from different institutions can draw attention to important discrepancies between the institutional- individualised residency programmes. It may even provide the baseline for potential future standardisation of veterinary training programmes.

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 the 01/08/2022, no resource was found in the veterinary literature on the satisfaction of veterinary radiology residents in regard to their training. The purpose of this study was to describe ECVDI® resident perception on the organisation/structure of their residency programmes and highlight important discrepancies between the individual programmes.

**Method**

The study design was observational and descriptive. 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 authorised by the College administration. A reminder email was sent approximately four weeks after the initial survey request in an attempt to increase the response rate. In case additional information on the survey was required, the name and email address of one of the authors (JM) was included in the emails. Participation in the survey was voluntary and each survey was anonymous.

The survey included five main categories: demographics, institution and residency structure, mentoring,support and supervision, satisfaction and overall feelings regarding the residency and success at the examinations. Questions included both multiple choice and free-text answer.

**Results**

*Demographics*

Of the 114 requests sent, 65 candidates responded. 59 (91%) of these were current resident 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 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.

*Institution and residency structure*

Responses related to questions on the institutions and the residency structure are shown in table 1.

*Mentoring, support and supervision*

Responses relating to questions on mentoring, support and supervision are shown in table 2.

*Satisfaction and feelings regarding the residency*

Responses relating to questions on satisfaction and overall feelings regarding the residency are shown in table 3.

*Examination success*Responses relating to questions on success are shown in table 4.

**Discussion**

Encouragingly, this study found that 87.7% of residents of the ECVDI® training programme 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 programmes. However, this study also identified some important differences between the individual ECVDI® residency programmes and between the residency programmes and the requirements set out by the 2021 ECVDI® Bylaws9. 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 programme to be accredited/reaccredited a list of requirements need to be fulfilled in order to standardise and to keep all programmes comparable8. 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 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. Eleven percent of respondents felt a complete 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 programme 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 programme director and the supervisor are ultimately responsible for his/her own training programme 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 post graduate students nor how to modify their way of teacher 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 speciality training programme. These CiPs are evidenced in the way of Work Placed Based Assessments (WPBS), supervisors’ assessments, summative assessment and the trainees own self-assessment. 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 weakness10. Implementation of a similar assessment programme in veterinary radiology may standardise the ECVDI® residency programmes and ensure all residents are receiving the same structure to 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 of the overall supervision and management of the educational process. Providing formal training to ECVDI® supervisors or giving residents access to an 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% respondents, respectively, did not feel they received appropriate mentoring or guidance, and only 76.9% of respondents stating they received mock exams. As mentioned previously, the 2021 ECDVI® 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 programme 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 leadership11. The increased workload and the large discrepancy between incomes of academic and private practice radiologists are making an impact on young medical radiologists’ decisions in choosing between private practice and academic careers12. The recruitment and retention challenges faced by the radiology departments in academic centres is not unique to human medicine and academia in the veterinary field is increasingly struggling to encourage radiologists into a university setting13. 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%14. Along with the staffing issues in academia, this trend could also bring about 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 considerations13. Encouragingly, 72.3% of respondents reported that seniors did or mostly did organise or participate in rounds, however, when asked if they received on call back up, 35.4%, 32.3% and 32.3% of residents responded No, Sometimes and Yes respectively. Subdividing the responses into what year of training the resident was in may have revealed a difference between senior back up of first year residents compared to more senior residents. It is debatable whether back up 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 physician15. The Royal College of Radiologist 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 trainee16.

The vast 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 for any psychic disorders17. Providing a support network and recognition of mental wellbeing 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 departments18. 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.

*Limitations*

A pilot study was not performed. Pilot studies allow researchers to identify whether respondents understand the questions and instructions, and whether the meaning of questions is the same for all respondents19. 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 programme 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.

The response rate was 57.0% (65 respondents out of 114). The results from a survey with a low response rate could be misleading and non-representative of the larger population19. Ideally a response rate of 60% in patient satisfaction and 80% in epidemiological questionnaires are considered acceptable20,21. 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 out21. Unfortunately, the low response rate prevented statistical analysis being performed on this data and may have led to skewed results, unrepresentative of the population. A low sample size allows for errors, including non-response/participation bias, where residents that are dissatisfied with their programmes are more likely to spend time filling out the survey compared to those who are satisfied22. 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.

*Conclusion*

The results of this survey are largely positive with 87.7% of ECVDI residents reporting to have enjoyed their residency and the vast majority of respondents feeling ready to work as radiologists at the end of their studies. However, this study has highlighted discrepancies in resident experiences across the residency programmes, especially in the way of mentoring and supervision, and it may be that greater alignment with human radiology training programmes may aid in the reduction of these. The hope is that this study may pave the way for future, more in-depth research.

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Category 1

(a) Conception and Design: Mortier

(b) Acquisition of Data: Mortier, White

(c) Analysis and Interpretation of Data: Maddox, Mortier, White

Category 2

(a) Drafting the Article: White

(b) Revising Article for Intellectual Content: Mortier, Maddox

Category 3

(a) Final Approval of the Completed Article: White, Mortier, Maddox

Category 4

(a) 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

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References

1. Lam CZ, Nguyen NN, Ferguson EC. Radiology Residents’ Satisfaction With Their Training and Education in the United States: Effect of Program Directors, Teaching Faculty, and Other Factors on Program Success. *Am J Roentgenol.* 2016; 206:907–916.

2. England E, Collins J, White RD, Seagull FJ, Deledda J. Radiology Report Turnaround Time: Effect on Resident Education. *Acad Radiol.* 2015; 22:662–667.

3. McNeeley MF, Perez FA, Chew FS. The Emotional Wellness of Radiology Trainees: Prevalence and Predictors of Burnout. *Acad Radiol.* 2013; 20:647–655.

4. Chigerwe M, Barter L, Dechant JE, Dear JD, Boudreaux KA. A preliminary study on assessment of wellbeing among veterinary medical house officers. *PLoS ONE.* 2021;16(6): e0253111.

5. Tayari H, Mocci R, Haji O, Dugdale AHA. Training satisfaction and well-being among veterinary anaesthesia residents: time for action. *Vet Anaesth Analg. 2021*; https://doi.org/10.1016/j.vaa.2021.06.016.

6. Bouskila-Yam O, Kluger AN. Strength-based performance appraisal and goal setting. *Hum. Resour. Manag* *Rev.* 2011; 21(2):137-147.

7. Niemiec CP, Ryan RM. Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory Res. Educ.* 2009; 7(2): 133–144.

8. Application for ECVDI Accreditation or Re-Accreditation of a standard small animal biased track Residency Programme in Veterinary Diagnostic Imaging. https://www.ecvdi.org/sites/www.ecvdi.org/files/medias/documents/ECVDI/Standard\_Small\_Animal\_Track\_Accreditation\_0.docx. Published October 1 2019. Accessed November 14 2022.

9. ECVDI Bylaws 2021. https://www.ecvdi.org/about-us/who-we-are/bylaws. Published November 1 2021. Accessed November 14 2022.

10 https://www.gmc-uk.org/-/media/documents/clinical-radiology-curriculum-2021\_pdf-83266369.pdf. Published Aug 1 2021. Accessed Nov 14 2022.

11. Donovan A. Views of radiology program directors on the role of mentorship in the training of radiology residents. *AJR Am J Roentgenol*. 2010;194(3):704-708.

12. Taljanovic MS, Hunter TB, Krupinski EA, Alcala JN, Fitzpatrick KA, Ovitt TW. Academic radiology: the reasons to stay or leave. *Acad Radiol.* 2003;10(12):1461-1468.

13. Jelinski MD, Silver TI. The career path choices of veterinary radiologists. *Vet Radiol Ultrasound.* 2015;56(1):109-113.

14. Fischetti AJ, Shiroma JT, Poteet BA. Academic and private practice partnerships in veterinary radiology residency training. *Vet Radiol Ultrasound.* 2017;58(4):367-372.

15. Farnan JM, Johnson JK, Meltzer DO, Humphrey HJ, Arora VM. On-call supervision and resident autonomy: from micromanager to absentee attending. *Am J Med*. 2009;122(8):784-788.

16. Guidance regarding on-call and handover for radiology trainee. https://www.rcr.ac.uk/sites/default/files/handover\_on\_call\_guidance\_2021\_0.pdf. Published March 2021. Accessed November 14 2022.

17. Magnavita N, Fileni A. Association of work-related stress with depression and anxiety in radiologists. *Radiol Med.* 2014;119(5):359-366.

18. Chetlen AL, Chan TL, Ballard DH, et al. Addressing Burnout in Radiologists. *Acad Radiol.* 2019;26(4):526-533.

19. Kelley K, Clark B, Brown V, Sitzia J. Good practice in the conduct and reporting of survey research. *Int J Qual Health Care.* 2003; 15(3):261–266.

20. Gilbert N. Stoneman P. Researching social life. Designing Samples. Sage; 2015 165p.

21. Sitzia J, Wood N. Response rate in patient satisfaction research: an analysis of 210 published studies. *Int J Qual Health Care.* 1998;10(4):311-317.

22. 6 types of survey bias and how to avoid them. Published Nov 08 2022. https://www.quantilope.com/resources/glossary-six-types-of-survey-biases-and-how-to-avoid. Published Nov 08 2022. Accessed March 16 2023.