

ASSESSING THE APPLICATION AND QUALITY OF COMPETENCY-BASED EDUCATION IN TRAINING PROGRAMMES OF VETERINARY SPECIALISTS IN EUROPE

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Abstract

Background: Due to developments and modernisation in the medical field, the need for modernisation in medical education is needed as well. This has been the reason for the development of evidence-based medical education (CBME) and its corresponding competency frameworks. As of now, CBME is accepted and applied in many medical institutions across the globe. The Competency-Based Veterinary Education (CBVE) is one of those frameworks and was specifically developed for veterinary curricula. This framework consists of nine essential competency domains for the veterinary professional. The current study uses the CBVE framework to assess the current training programmes of veterinary specialists in Europe. To become a veterinary specialist in Europe, one must follow a training programme at one of the 27 colleges of the European board of specialisation (EBVS). The description of these training programmes can be found in the training programme descriptions or “training brochures” of each of these colleges. The way in which CBVE is applied in these specialist training programmes has not been studied until now. In this study, the current situation regarding competency training in veterinary specialist programmes will be analysed and we will evaluate how the competency domains are represented in these programmes.

Goals of the study: In the current study, a document analysis and a pilot-study are performed. The goal of the document analysis was to evaluate which training tools were used within the different training programmes of EBVS colleges. The goals of the pilot-study were 1) To find out if and how the training tools, as mentioned in the training brochure, were applied within the actual programme of one of the colleges (ECEIM). 2) To find out to what extent these training tools contributed to the personal development of competencies of residents. 3) To find out if there was a difference in perception between diplomats and residents on how the competency-based education was represented in the programme.

Methods: A mixed-method approach was utilised through a combination of qualitative and quantitative research methods. First, a document analysis was carried out on the different training brochures of the different EBVS colleges to find out which training tools were used in the various residency programmes. Based on the results of this document analysis, a questionnaire was developed. This questionnaire functioned as a pilot-study and was only distributed among members of one of the 27 EBVS colleges: the European College of Equine Internal Medicine (ECEIM).

Results: The results of the document analysis showed that diplomate supervision and hands-on clinical training were described in all programmes, and that workplace-based assessments were rarely used. The results of the pilot-study showed that the training brochure of the ECEIM was often in line with the actual programme in its practical setting. Some mandatory tools such as the review of the resident's performance, workshops and seminars, clinical teaching, and self-study, however, were not applied as frequent as described.

Limitations: The document analysis was incomplete due to the fact that some colleges had no (suitable) documents available. Comparing the documents that were available was a challenge as they differed in the level of detail provided. For the pilot-study, no random sample was taken.

Conclusions: Overall, we found that all competency domains, as described by the CBVE, were represented in the ECEIM residency programme. Especially the domains regarding individual animal care and clinical reasoning were well represented. Animal population care and public health were represented the least. We also found that the brochure was in line with the actual training programme for the most part. Furthermore, residents and diplomats differed in their opinion on the (amount of) appliance of certain training tools such as books clubs, specialty specific education, self-study, review of performance, MSF, DOPS, CBD and mini-CEX. Based on the results of this study, expanding the pilot-study to other EBVS colleges is thought to be feasible.

Keywords: Competency-based medical education, CMBE, Competency-based veterinary education, CBVE, Veterinary competencies, EBVS, Veterinary specialists, Residency programme

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Introduction

The work of veterinary specialists is complex and diverse. The working environment of these specialists demands not only technical and theoretical knowledge of their specific specialisation, but requires other competencies as well (Rhind et al., 2011).

Within medical education, human and veterinary alike, efforts have been made to develop specific competency frameworks that meet patient and societal needs. These frameworks serve as guidelines for medical educational programmes and are applied to undergraduate as well as postgraduate programmes (Bok, Jaarsma, Teunissen, van der Vleuten, Cees PM, & van Beukelen, 2011; Frank, J. R., Snell, & Sherbino, 2015).

Since the start of the 21st century, competency-based medical education (or CBME) is accepted and applied in medical institutions across the globe. Due to the increase in variety of specialties and subspecialties within medicine in the last half century, physicians struggled with a decrease in common identity, language and understanding. Thus, collaboration and communication between those working in different fields in medicine was needed. This shift in the medical field was one of the reasons that the CBME and its corresponding competency frameworks were developed (Frenk et al., 2010; Touchie & ten Cate, 2016).

However, CBME has its shortcomings. Critics of the education method point to issues with assessment and implementation, and with the concept of competencies (Frank, Jason R. et al., 2010). Studies on the effects of CBME on student's learning process vary, some showing results of it being effective (Pandit et al., 2019) and others with no significant results (Kerdijk, Snoek, van Hell, & Cohen-Schotanus, 2013). Nonetheless, CBME is supported by many in the medical education community and improvements to its original concept have been made (Touchie & ten Cate, 2016; van der Vleuten, Cees PM, 2015). CBME is especially advocated for its outcome-based approach, learner centeredness, emphasis on abilities and de-emphasis on time-based training (Frank, Jason R. et al., 2010).

An example of a competency-based framework used in veterinary medicine is the Competency-Based Veterinary Education (CBVE) framework of the Association of American Veterinary Medical Colleges (AAVMC). In this study, the CBVE framework will be used as a guideline to assess the application and quality of competency-based education in residency programmes of veterinary specialists in Europe. The CBVE was originally developed to serve as a guideline for education and preparation of veterinary (under)graduates for their professional career. To the best of our knowledge, no specific competency frameworks for veterinary postgraduate education overarching the various disciplines have been developed. Therefore, the CBVE framework will be used in this study to evaluate competency training in postgraduate education. The AAVMC itself describes that the framework can function as a foundation for implementation in any veterinary curriculum (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018). The framework consists of nine domains of competence which will be briefly illustrated later in the introduction.

Though not specifically mentioned, it is expected that the CBVE framework is applied in undergraduate and graduate programmes of AAVMC member institutions (The American Association of Veterinary Medicine Colleges, 2021). How the competency framework stands out in veterinary postgraduate programmes is yet unknown. In this study, the current situation regarding competency training in veterinary postgraduate programmes will be analysed to create insight into the inclusiveness of different competencies in these programmes. This is essential in order to contribute to the development of veterinary specialists with competencies that meet the needs of their patients and expectations of society.

Research on the essential competencies of veterinarians in general has been performed in the past (Bok et al., 2011). In the current study, we will attempt to assess which of these competencies are represented in the current residency programmes, and how.

Context of the study

Graduated veterinarians, either recent graduates or long-term practitioners, have the opportunity to become specialists. In Europe, all acknowledged veterinary specialisms are represented by 27 colleges of the European Board of Veterinary Specialization (otherwise known as the EBVS) (European Board of Veterinary Specialisation, 2020).

These colleges offer training programmes which usually have a minimum duration of three years (full-time) which can be extended to a maximum duration of five or six years, to grant more flexibility (European College of Bovine Health Management, 2020; European College of Equine Internal Medicine, 2020). Those who follow these training programmes are so called 'residents' and they are supervised by so called 'diplomats' of that certain college. Diplomats are the graduated specialists from an EBVS college. The programmes are taught at different registered institutions throughout Europe and even beyond European borders. Academic institutions as well as high-quality private practices can be approved for registration.

The different institutions are obligated to follow guidelines concerning the training programmes as set in training brochures, bylaws or in the policies and procedures of the colleges (see appendix 2). These documents are hereafter described as 'training brochures', 'training programme descriptions' or 'residency programmes'. The training brochures describe the use of certain training tools within their programmes and requirements for graduation.

In this study, a systematic document analysis was performed using these training programme descriptions. With the document analysis, an attempt was made to create an overview of these different training tools used by the different colleges of the EBVS.

Since all graduated residents from a certain college are granted the same title, their competence could be expected to be of a specific minimum quality. It can, therefore, be expected that training programmes of the same college given at various institutions are comparable. The guidelines described in training brochures can help to reinforce the similarity between programmes given at different institutions. However, it is unknown if colleges actually apply the guidelines and training tools as described in their training brochures.

A pilot-study on one of the 27 colleges was done to create insight in the latter. The college used for the pilot-study is the European college of Equine Internal Medicine (ECEIM). Based on the results of the document analysis, a questionnaire was constructed to examine if, and how, the training tools were used in the specialist program. Furthermore, the questionnaire was applied to investigate how the training programmes and their training tools contribute to the development of different competencies as described in the CBVE framework.

Goals of the study

The goal of the document analysis was;

- 1) To evaluate which training tools are described in the different training programmes of veterinary specialists colleges.

The goals of the pilot-study were;

- 1) To find out if and how the training tools, as mentioned in the training brochures, were applied within the actual programme.
- 2) To find out if these training tools contributed to the personal development of competencies of residents.
- 3) To find out if there was a difference in perception between diplomats and residents on how the competency-based education is represented in the programme.

Each veterinary specialisation is unique and, therefore, requires its own set of skills. The focus on certain competency domains may differ between colleges for this same reason. It is, therefore, important to clarify that the absence of development of certain competencies within a programme does not immediately negatively affect the quality of that programme.

The aim of this study, overall, was to assess the application and quality of competency-based education in training programmes of the different EBVS colleges (European Board of Veterinary Specialisation, 2020).

The essential competency domains for the veterinary professional

In this paragraph, the nine competency domains of the CBVE framework are briefly described. This description is based on the definition given by the AAVMC in the CBVE framework (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018).

Domain 1: Clinical reasoning and decision making

This competency domain describes the ability of a veterinary professional to use evidence based veterinary medicine (EBVM) to make decisions whilst taking a variety of relevant factors into consideration.

More specifically, this means that the graduate has the ability to gather information about the patient through physical examination, anamnesis and to understand diagnostic results.

The veterinary professional is able to set up a differential diagnosis, a diagnostic plan and a treatment plan through prioritizing symptoms and problems whilst considering welfare of the animal, wishes of the client and economic factors. Recognition of emergency situations as well as adaptation of a graduate's available knowledge to new situations or circumstances are important competencies in this domain. And finally, the veterinary professional is aware of their limitations in knowledge and skill (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018).

Domain 2: Individual Animal Care and Management

The second competency domain covers a graduate's ability to perform medical procedures regarding the wellbeing, healthcare and treatment of individual animals.

This includes the ability of the graduate to perform elective, routine and emergency veterinary procedures as well as post-procedural care. Performance of palliative and curative care and promotion of preventive care appropriate in context of the wellbeing of the animals are described as well (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018).

Domain 3: Animal Population Care and Management

The third domain describes the ability to apply population management principles. It considers the essential competencies regarding herd health, including disease prevention and control. It describes the ability to make recommendations for population management whilst taking legal regulations and economic factors into consideration. The abilities of a graduate to develop and evaluate biosecurity protocols, to give advice on nutritional and disease management and housing, and to promote or give

advice on practices that increase herd welfare (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018).

Domain 4: Public Health

The fourth domain describes competencies regarding public health. The veterinarian plays an important role in this area, being the gatekeepers of zoonotic disease. A graduate in veterinary medicine should, therefore, be able to recognize zoonotic diseases in individuals as well as herds and they must respond accordingly (for instance, report outbreak of the disease to the correct institution). Knowledge of infection management by measures such as quarantine and disinfection are, therefore, essential.

The promotion of public health is crucial as well, the veterinary professional has an educative role among the general public on matters regarding food safety, management of animal waste, infection control, and a responsible use of antibiotics (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018).

Domain 5: Communication

This fifth competency domain describes the abilities a veterinary graduate must have regarding communication. There are many sectors in which a graduate may work, all of which require a certain level of skill in communication. The abilities to listen well and communicate professionally and effectively are essential.

Veterinary professionals should be able to adapt their language to the audience, using non-professional language when communicating with clients, and professional language when communicating with other professionals. Upon documentation, professional terminology should be used, and the documentation must meet professional standards and legal requirements

In addition, engagement of clients regarding difficult and emotional matters, such as euthanasia or palliative care, is important as well. A good practitioner knows how to be compassionate whilst staying professional (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018).

Domain 6: Collaboration

Being able to collaborate with colleagues, clients and other stakeholders is a fundamental competency for the veterinary professional. This includes integrating and respecting contributions from others when making a decision, thereby demonstrating inclusivity. The professional should present themselves as either leader or team member based on their skill, experience and context of the situation (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018).

Domain 7: Professionalism and Professional Identity

This domain describes the ability of a professional veterinarian to apply ethical reasoning, time management and self-reflection when making decisions in the work environment. This includes the recognition of abuse and a correct response thereof, prioritizing certain tasks when importance or urgency is high as well as being critical on their own decision making.

In addition, the graduate is proactive when it comes to self-directed learning. They manage their expectations and recognize signs of stress in the workplace in themselves as well as in their colleagues, and realise when professional support is needed (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018).

Domain 8: Financial and Practice Management

Since many veterinarians work in small practices, or even practices of their own, it is important for a graduate to be able to weigh economic factors in their decision making on both professional and business-related matters. Whilst keeping the financial matters in mind, they act in accordance with regulations on veterinary practice, meet legal requirements and advocate for safe practices and health for patients, clients and colleagues (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018).

Domain 9: Scholarship

In this final domain, the ability of the graduate to evaluate and distribute information in a correct manner is described. This includes the application of research principles towards (scientific) information, and to know when and where to use this retrieved information. Finally, the graduate is able to educate others with their evidence-based knowledge (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018).

Definitions

Competency

An observable capability or skill of a health professional in relation to a certain activity. Competencies are observable and, therefore, measurable. This makes it possible to ensure acquisition of a competency to a certain individual (Frank et al., 2010).

Competency framework

A clear and structured representation of interrelated and important competencies (Smothers, 2013).

Workplace-based assessment (WPBA)

Workplace-based assessment is an overarching term for various methods that can be used to assess the residents' performance during a training programme (Brennan et al., 2020; Callander et al., 2017).

Materials and Methods

Study design

In the current study, a mixed-method approach was utilised through a combination of qualitative and quantitative research methods. A systematic document analysis on the residency training brochures of the different colleges of the EBVS was applied to create an overview of the training tools used by the different colleges of the EBVS.

Based on the results of this document analysis, a questionnaire was constructed to examine how, and if, these training tools were actually used in practice in the specialist training programmes of the ECEIM at different institutions. In addition, the questionnaire was applied to investigate how the training programmes and their training tools contributed to the development of different competencies as described in the CBVE framework (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018). Furthermore, the questionnaire was applied to identify possible differences in perception between diplomats and residents on how the competency-based education is represented in the programme.

Document analysis

Data collection

The majority of colleges of the EBVS have detailed descriptions of their training programmes. These descriptions are included in the constitution and bylaws of a college, the policies and procedures of a college, or described in a separate document called the 'training brochure' or simply 'training programme description'. These are the type of documents that were used for the document analysis and a list of the exact documents used can be found in appendix 2.

The level of detail in which the different colleges describe their residency programmes in these documents were quite variable. Consequently, some documents had to be excluded from the analysis. To be included, colleges had to have either a separate document, or a separate section within their 'policies and procedures' or 'constitutions and bylaws' documents which clearly described the details of the residency training programme. If the information of a college regarding the residency training programme was spread across one or different documents without a clear setup, or if the description had too little detail, the college was excluded from the analysis.

It is important to mention that there are two kinds of programmes which a resident may follow to become a diplomate. The colleges have a standard residency programme and an alternative residency programme. The alternative programme often has a longer duration than the standard residency programme and is used when a resident is unable to work full-time on his/her training. The policy regarding these alternative programmes differs per college. The alternative programmes are, however, obligated to incorporate the same requirements and objectives as the standard residency programmes. Following the alternative programme instead of the standard programme is not considered to be ideal (European College of Equine Internal Medicine, 2020). For reasons of convenience, only the standard residency programmes of the colleges were analysed in the document analysis. However, the questionnaire was distributed among as many members as possible, this included residents in both standard and alternative programmes.

Data analysis

To assess which training tools were used within the different training programmes of veterinary specialists, the documents were systematically analysed through content analysis and thematic analysis with an inductive approach to establish a thorough assessment (Bowen, 2009). The training tools in the brochures were manually listed and the brochures were re-read several times to ensure no training tool was overseen.

Training tools were defined as methods and tools that were expected to contribute to the overall competency of a resident. The tools could either be methods of active training in the field of work (such as clinical training), methods that contribute to a resident's knowledge regarding their specialty field or overall skills (such as doing a research project or engaging in journal clubs), certain milestones that show proof of a resident's competency (such as a publication or maintaining a case-log) or tools to assess a resident's performance (such as a client survey). If a certain tool was mentioned to be applied in at least one of the colleges, it was added to the list of training tools. To minimise subjective influence of interpretation in the analysis, the training tools which were added to the list had to be clearly described in the programme brochure.

In the analysis, training tools were considered to be applied in a programme if they were specifically mentioned in their programme description. If a training tool was not clearly mentioned in a college's brochure, it was not considered to be applied. In some cases, training tools were mentioned as recommended but not mandatory or it was unclear if it was recommended or mandatory.

In those cases, all training tools that were mentioned in the training brochure were considered to be applied in the training programme.

Pilot-study

The document analysis was followed by a pilot-study to reduce the impact of possible biases within the study, and to examine the feasibility of a follow-up study (Bowen, 2009). The results of the document analysis were used to develop a questionnaire. This questionnaire was used to reach the three goals of the pilot study, as mentioned earlier.

Participants

The questionnaire was developed for the European College of Equine Internal Medicine (ECEIM, which is one of the 27 specialist colleges) and distributed among its members. It is, therefore, important to note that the results of the questionnaire can only be interpreted for the ECEIM only, and not for other EBVS colleges. The participants of the questionnaire were either residents or diplomats of the ECEIM involved in standard or alternative residency programmes. Diplomats who were currently not supervising residents could also participate in the study.

Development

ECEIM residents and diplomats have a variety of nationalities. Therefore, the English language was chosen for the survey, to make it as accessible as possible. The questionnaire (see appendix 4) consisted almost entirely of closed questions.

The development of the questionnaire was based on the results of the document analysis and was separated into two parts.

In the first part, questions regarding the training tools were found in training brochures were asked. For each training tool, the following set of questions was asked:

- 1) Is this training tool applied in your residency programme (so in this case, the ECEIM programme)? It was specified that by 'your programme' was meant; the residency programme(s) you follow as a resident or supervise(d) as a diplomate. The answer could either be yes or no. Only if the participants answered yes to this question, did the survey continue to the following questions.
- 2) Either how much time is spent on this tool, or how often is it used, based on the context. Depending on the tool, participants were asked how often the tool was used on an annual, weekly or monthly basis, or how much time of the programme is spent on that certain tool.
- 3) To the development of which competency domains does this specific tool contribute. The participants answered this on a five-point response scale, ranging from 'a great deal' to 'not at all'. This regarded the competency domains as described by the AAMVC (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018). The competency domains, and what they encompass, were explained in the beginning of the questionnaire.

In the second part of the survey, participants were asked to rate how the overall development of the nine competency domains are represented in their residency programme. The rating scale was from 1 (not represented at all) to 10 (extremely well represented).

Data Collection

The link to the questionnaire was distributed to members of the ECEIM through email and Facebook groups on the 10th of February 2021. A reminder was sent on the 21st of March 2021 and the survey closed on the 31st of March 2021. Qualtrics software was used to build, distribute, and collect data from the survey (Qualtrics, 2015).

Ethical considerations

The aim and content of the study were explained to the participants at the start of the questionnaire. It was conducted anonymously and voluntarily. Permission to use the data was requested and confidentiality of the data was assured. All participants agreed with an online consent form before starting the questionnaire.

Data analysis

To meet the first goal of the pilot-study, the content of the training brochure of the ECEIM was compared to the outcome of responses of residents and diplomats. As mentioned before, participants

were asked if, how and how often training tools were used in their residency. The results are presented in tables per training tool. Most of these tables are complemented with a visualisation of the data, either in box plots or bar charts. Responses of residents and diplomats are shown separately in the tables, in addition to their combined data.

To meet the second goal of the pilot-study, respondents were asked to rate each tool on how it contributes to development of the different competency domains. The responses were analysed, and the results are presented in tables per training tool.

To meet the third goal of the pilot-study, residents and diplomats were asked to rate how the different competency domains are represented in their own residency training programme. The data of these responses were organised in tables and visualised in boxplots. In the tables, data of residents and diplomats are shown collectively and separately. The boxplots only show the data of residents and diplomats separately.

Python along with the Jupyter Notebooks extension and other data visualisation libraries were used to analyse and visualise the data. (Anaconda Inc., 2020; Van Rossum & Drake, 2009). The libraries used and the link to the code used to analyse and visualise the data can be found in appendix 3.

Results

Document analysis

Not all training programme descriptions of the EBVS colleges were available for the document analysis. Twenty-four of the 27 colleges of the EBVS granted access to the documents which contained this information. Two of the 24 colleges had documents that did not meet the inclusion criteria of the document analysis. As a result, 22 documents were included in the study. The references to each of these documents can be found in appendix 2.

The 22 EBVS colleges whose descriptions did meet the inclusion criteria were those of;

- The ECAR: European College of animal reproduction
- The ECAAH: European College of Aquatic Animal Health
- The ECBHM: European College of Bovine Health Management
- The ECEIM: European College of Equine Internal Medicine
- The ECPVS: European College of Poultry Veterinary Science
- The ECSMHM: European College of Small Ruminant Health Management
- The ECVA: European College of Veterinary Anaesthesia and Analgesia
- The ECVN: European College of Veterinary and Comparative Nutrition
- The ECVCP: European College of Veterinary Clinical Pathology
- The ECVD: European College of Veterinary Dermatology
- The ECVDI: European College of Veterinary Diagnostic Imaging
- The ECVECC: European College of Veterinary Emergency and Critical Care
- The ECVIM: European College of Veterinary Internal Medicine
- The ECVN: European College of Veterinary Neurology
- The ECVO: European College of Veterinary Ophthalmologists
- The ECV: European College of Veterinary Pathologists
- The ECVPT: European College of Veterinary Pharmacology and Toxicology
- The ECVSMR: European College of Veterinary Sports Medicine and Rehabilitation
- The ECVS: European College of Veterinary Surgeons
- The ECZM: European College of Zoological Medicine (small mammal)
- The EVDC: European Veterinary Dental College
- The EVPC: European Veterinary Parasitology College

The EBVS colleges that had no training programme descriptions available or those whose descriptions did not meet the inclusion criteria were those of;

- The ECLAM: European College of Veterinary Laboratory Animal Medicine
- The ECAWBM: European College of Animal Welfare and Behavioural Medicine
- The ECPHM: European College of Porcine Health Management
- The ECV: European College of Veterinary Microbiology
- The ECVPH: European College of Veterinary Public Health

These colleges will, from this point onwards, be referred to by their abbreviation.

In total, 21 training tools were clearly described in the training brochures of the different colleges. An overview of the results of the document analysis is shown in the table found in appendix 1. These criteria and the results of the document analysis will be described per training tool in this section of the article.

Hands-on clinical training

Hands-on clinical training was defined as (partially) supervised clinical service from the resident. It could also include observational training, which is often applied in an early stage of a residency programme (European College of Veterinary Dermatology, 2020). All colleges that were included in the analysis clearly described that hands-on clinical training was applied in their programme. Furthermore, most colleges described the amount of time that should be spent on clinical activity within their programme. This was described as either a percentage of time or an estimate thereof, or in months or weeks of (full-time) clinical work. Some of the colleges also gave minimal or maximal percentages of time or weeks and days that should be spent on clinical training. An overview of this data is shown in table 1.

Involvement in the direct work-up of patients (diagnosis and treatment).

The brochures of 12 out of the 22 colleges described that the resident was responsible for the diagnosis and treatment of patients, or that resident had to be the primary clinician in a certain number of cases. These brochures were those of the ECAR, the ECBHM, the ECEIM, the ECVCN, the ECVD, the ECVECC, the ECVIM, the ECVN, the ECVO, the ECVSMR, the ECVS and the EVDC.

Performing therapeutic and diagnostic procedures

In the brochures of 18 out of the 22 colleges, it was clearly described that therapeutic and diagnostic procedures were performed during the residency. This could include, for example, surgery, performing diagnostic tests and imaging and diagnostic work in the laboratory. These were the brochures of the ECAR, the ECAAH, the ECBHM, the ECEIM, the ECPVS, the ECSMHM, the ECVAA, the ECVC, the ECVD, the ECVDI, the ECVECC, the ECVIM, the ECVN, the ECVO, the ECVP, ECVSMR, the ECVS and the ECZM.

Resident has primary responsibility in majority of cases

In only 5 of the 22 colleges, the brochure clearly described that the resident had to be the primary clinician in the majority of cases. These colleges were the ECEIM, the ECVD, the ECVECC, the ECVN and the ECVSMR.

Direct diplomate supervision

This tool was marked as 'applied' for all 22 colleges. All brochures described that a certified diplomate must be available (on location) for consultation, for a significant part of the programme. 'Significant' is not further defined, since colleges were often unclear on the exact amount of time that must be spent under diplomate supervision.

Receiving clinical appointments

In 17 of the 22 colleges, the brochure clearly described that the resident should receive clinical appointments and is responsible for them. These colleges were the ECAR, the ECAAH, the ECBHM, the

Colleges of the EBVS

Colleges of the EBVS	Time spent on clinical training
ECAR	60%
ECAAH	64.1%*
ECBHM	52.5%*
ECEIM	67.9%*
ECPHM	NA
ECPVS	25-75%
ECSMHM	66%
ECVAA	60%
ECVCN	35%
ECVCP	NA
ECVD	Min. 32.1%*, Max. 75%
ECVDI	76.9%*
ECVECC	46.2%*
ECVIM	60%
ECVN	75%
ECVO	83.3%*
ECVP	NA
ECVPT	NA
ECVSMR	60%
ECVS	60% (min.)
ECZM	NA
EVDC	75% (min.)
EVPC	NA

Table 1: Amount of time spent on clinical training in the different colleges of the EBVS. *These numbers were originally presented as weeks or days; these numbers were converted to percentages. 156 weeks was taken as the duration of an entire residency programme for these calculations

ECEIM, the ECSMHM, the ECVA, the ECVCN, the ECVD, the ECVDI, the ECVECC, the ECVIM, the ECVN, the ECVO, the ECVSMR, the ECVS, the ECZM and the EVDC.

Supervising daily management of hospitalised or laboratory animals

The brochures of 6 out of the 22 colleges described the supervision and daily management of hospitalised or laboratory animals to be a responsibility of the resident. These were the brochures of the ECAAH, the ECEIM, the ECVIM, the ECVN, the ECVO and the ECZM.

Training rotations in related disciplines and training units

The brochures of 13 out of the 22 colleges clearly described that the resident must spend a given amount of time, or see a given number of cases in other disciplines than the main discipline of their own residency. The colleges that applied this tool were the ECBHM, the ECEIM, the ECVA, the ECVDI, the ECVECC, the ECVIM, the ECVN, the ECVO, the ECVPT, the ECVSMR, the ECZM and the EVDC.

Participating in an externship

The brochures of 8 out of the 22 colleges described that the resident may follow training in their own field of residency at an external location. In some cases, this was only required if the home institution did not provide the adequate case exposure or equipment (European College of Veterinary Sports Medicine and Rehabilitation, 2017). This was not the case for the ECBHM and the ECZM, however. The ECBM demanded an externship of 4 weeks (European College of Bovine Health Management, 2020) and the ECZM described that the resident must spend a minimum of 20 days on an external rotation at a laboratory research facility (European College of Zoological Medicine, 2018). The colleges which applied this tool were the ECAR, the ECVA, the ECVCN, the ECVCP, the ECVSMR, the ECBHM and the ECZM.

Performing an extensive amount of laboratory work

The brochures of 3 out of the 22 colleges described that a significant part of the programme takes place in a laboratory. This 'significant part' is not strictly defined, since the brochures that applied this tool were not always clear on the percentage of time that should be spent on it. The ECVPS, however, was and stated that 50% of the programme must be spent on laboratory work (European College of Poultry Veterinary Science, 2017). The colleges which applied this training tool were the ECAAH, the ECPVS and the ECSMHM.

Engagement in case presentations

The brochures of 13 out of the 22 colleges described that engagement in (formal) case-based discussion sessions is part of the residency programme. These were the brochures of the ECBHM, the ECEIM, the ECPVS, the ECSMHM, the ECVCN, the ECVDI, the ECVECC, the ECVIM, the ECVN, the ECVSMR, the ECVS, the ECZM and the EVPC.

Engagement in journal/book clubs (scientific meetings)

The brochures of 14 out of the 22 colleges described that engagement in either journal clubs, scientific meetings or book clubs (or a combination of these) is part of the residency programme. These were the brochures of the ECAR, the ECBHM, the ECEIM, the ECPVS, the ECSMHM, the ECVA, the ECVD, the ECVDI, the ECVECC, the ECVN, the ECVO, the ECVPT, the ECVSMR, the ECVS and the ECZM.

Conference attendance

The brochures of 21 out of 22 colleges, all except the ECVP, mentioned that residents were required or encouraged to attend conferences relevant to their specialty. This tool was often described as mandatory, sometimes with a given minimum number of conferences that must be attended. These numbers and their corresponding colleges are shown in table 2.

Colleges of the EBVS **Minimum amount of conference attendance**

<i>ECBHM</i>	3
<i>ECEIM</i>	3
<i>ECPVS</i>	3
<i>ECSMHM</i>	3
<i>ECVSMR</i>	3
<i>ECZM</i>	2

Table 2: minimal amount of conference attendance for residents of various colleges of the EBVS

Attendance of (in-house) resident workshops/seminars

This training tool was described in the brochures of 14 out of the 22 colleges. These were the brochures of the ECAR, the ECBHM, the ECEIM, the ECVPS, the ECSMHM, the ECVA, the ECVN, the ECVCP, the ECVD, the ECVECC, the ECVIM, the ECVN, the ECVPT, the ECVSMR and the ECZM.

Scientific publications

The brochures of all 22 colleges described that residents were required to publish papers in a peer-reviewed scientific journal. Often, the training brochures mentioned that the resident has to be first author in at least one publication (European College of Aquatic Animal Health, 2019; European College of Bovine Health Management, 2020; European College of Equine Internal Medicine, 2020). However, residents of the ECAR could also publish both their publications as co-author. For the second publication, most colleges described that the resident should be either first or co-author or be first author of a case report or (small) case series.

Participation in clinical teaching

The brochures of 17 out of the 22 colleges described that the resident is required or encouraged to participate in any form of clinical teaching. This may be at their home institution or at external institutions. The brochures of the ECAR, the ECBHM, the ECAAH, the ECEIM, the ECVPS, the ECSMHM, the ECVA, the ECVN, the ECVD, the ECVDI, the ECVECC, the ECVIM, the ECVN, the ECVO, the ECVPT, the ECZM and the EVDC described clinical teaching to be part of the programme.

Giving presentations on conferences

The brochures of 17 out of the 22 colleges described that the resident is required or encouraged to give presentations at national and international conferences. These were the brochures of the ECAR, the ECBHM, the ECEIM, the ECPVS, the ECSMHM, the ECVN, the ECVCP, the ECVD, the ECVDI, the ECVIM, the ECVO, the ECVPT, the ECVSMR, the ECVS, the ECZM and the EVDC.

Setting up a research project

The brochures of 17 out of the 20 colleges described that the resident should set up a research project during their residency or that a specific amount of time of the programme should be spent on research. These were the ECAR, the ECAAH, the ECBHM, the ECEIM, the ECPVS, the ECSMHM, the ECVA, the ECVN, the ECVD, the ECVECC, the ECVIM, the ECVN, the ECVO, the ECVPT, the ECZM and the EVDC.

Writing a case report

The brochures of 15 out of the 22 colleges applied writing case reports in their programmes. Sometimes, a brochure mentioned that one of the publications that a resident must have (as mentioned earlier) could either be an original research paper or a case series or a case report. In these cases, this tool is also marked as 'applied', even though the case report itself is not considered mandatory. The colleges which applied this training tool were the ECAR, the ECAAH, the ECBHM, the

ECEIM, the ECPVS, the ECSMHM, the ECVA, the ECVCN, the ECVD, the ECVECC, the ECVIM, the ECVN, the ECSMR, the EVCS and the ECZM.

Maintaining a case-log

The brochures of 19 out of the 22 colleges described that the resident is required or encouraged to maintain a log of the cases they have seen during their residency. The information of each logged case could differ between colleges, and some colleges have a minimum number of cases that the resident must have logged at the end of their residency. These numbers and their corresponding colleges are shown in table 3. These colleges include the ECAR, the ECAAH, the ECBHM, the ECEIM, the ECPVS, the ECVA, the ECVCN, the ECVCP, the ECVD, the ECVDI, the ECVIM, ECVN, the ECVO, the ECVPT, the ECVSMR, the EVCS, the ECZM, the EVDC and the EVPC.

Maintaining a diary/log of activities

In 18 of the 22 colleges, the brochure described that the resident is required or encouraged to maintain a log of their activities, such as clinical service, externships, teaching, attending seminars, journal- and book clubs or conferences and self-study. These colleges were the ECAR, the ECAAH, the ECBHM, the ECEIM, the ECPVS, the ECSMHM, the ECVA, the ECVCN, the ECVCP, the ECVD, the ECVDI, the ECVIM, the ECVO, the ECVPT, the ECVSMR, the EVCS, the ECZM and the EVPC.

Workplace-based assessments

Workplace-based assessments, or WPBAs, are methods to assess the residents' performance during a training programme (Brennan et al., 2020; Callander et al., 2017).

Clinically Appraised Topics (CAT)

A clinically appraised topic is a summary of the search for modern and high-quality evidence, which is used to answer one or multiple clinical questions. This tool encourages veterinarians to practice evidence-based veterinary medicine (or EBVM). The ECVD was the only college that mentioned the use of this WPBA.

Multi-source feedback (MSF)

Multi-source feedback or MSF is another WPBA. It is used to assess generic skills which comply to 'Good Veterinary Practice' such as communication, collaboration and leadership. The ECEIM brochure described that all professionals who work alongside the resident, report this feedback to the supervisor personally (European College of Equine Internal Medicine, 2020). The ECEIM was the only college that mentioned the use of MSF.

Direct Observation of Procedural Skills (DOPS)

Direct Observation of Procedural Skills or DOPS is also a WPBA. It helps to assess the residents' skills in a practical procedure by comparing the performance to a systematic checklist. The procedure is followed by immediate feedback to acknowledge a resident's strengths and points of improvement

Colleges of the EBVS	Minimum number of cases logged
ECAR	NA
ECAAH	100
ECBHM	NA
ECEIM	600
ECPVS	NA
ECSMHM	NA
ECVA	300
ECVCN	NA
ECVCP	NA
ECVD	500
ECVDI	150
ECVECC	NA
ECVIM	NA
ECVN	200
ECVO	212
ECVPT	NA
ECVSMR	300
EVCS	400 (Small animal) 300 (large animal)
ECZM	450
EVDC	500
EVPC	NA

Table 3: Minimum number of cases logged at the end of the residency for various colleges of the EBVS

(European College of Equine Internal Medicine, 2020). Only the ECEIM and the ECVD mentioned the use of DOPS.

Case-based discussion (CbD) with colleagues and supervisors

Case based Discussion is another WPBA. It is the discussion of a case which was presented during clinical rounds. CbD is a method to indicate a resident's capability in patient management, clinical care and the documentation of cases. The writing of out-patient letters or a discharge summary are also part of the CbD (European College of Equine Internal Medicine, 2020). Only the ECEIM and the ECVD mentioned the use of case-based discussion.

Client survey (PS)

A Client Survey or CS helps to assess performance of the resident in communication, professionalism and effectiveness of the consultation. It focuses purely on the performance of the resident during consultations. CS is another WPBA (European College of Equine Internal Medicine, 2020). The ECEIM was the only college to mention the use of client surveys.

Mini-Clinical Evaluation Exercises (mini-CEX)

A Mini-Clinical Evaluation Exercise or mini-CEX is a WPBA which helps to assess a resident's skills in anamnesis, examination and clinical reasoning. In the mini-CEX, a clinical situation with a patient is evaluated. It may be applied at any moment when a resident, patient and assessor are available (European College of Equine Internal Medicine, 2020). Only the ECEIM and the ECVD mentioned the use of mini-CEX.

Review performance of resident through discussion with supervisor

The brochures of 18 out of the 22 colleges described that the resident and supervisor have formal meetings for the evaluation of the residents' performance and progress. These were the brochures of the ECAR, the ECAAH, the ECBHM, the ECEIM, the ECSMHM, the ECVA, the ECVCN, the ECVD, the ECVDI, the ECVIM, the ECVN, the ECVO, the ECVP, the ECVPT, the ECVSMR, the ECVS, the ECZM and the EVDC.

Specialty specific tuition

Only 6 of the 22 colleges described specialty specific education as part of their programme. This education includes lectures, seminars and practicing procedures organised specifically for residents. These colleges were the ECAR, the ECVDI, the ECVECC, the ECVPT, the ECVSMR and the EVDC.

Practice self-directed study

The brochure of 12 out of the 22 colleges described that residents must practice self-study during the residency programme, or mentioned a specific amount of time which should be devoted to self-directed study. These were the brochures of the ECAR, the ECAAH, the ECEIM, the ECVCN, the ECVD, the ECVDI, the ECVECC, the ECVN, the ECVP, the ECVSMR, the EVDC and the EVPC.

Pilot-study

Participants

Currently, the ECEIM has 178 certified diplomats and 104 residents which are either actively participating in their programme, paused, or finished¹ it. Thus, in total, 282 potential participants were approached for the questionnaire. 77 participants started the questionnaire of the pilot-study of which 49 completed it. The total response rate of the questionnaire is 27.30%. This makes the completion rate 63.6%. At the start of the questionnaire, participants granted some personal information. The results regarding this information will be displayed in this section.

Diplomats vs. residents

Participants were asked if they were resident or diplomate of an ECEIM programme. 53.2% (or 41) of the participants who started the questionnaire were diplomats, and 46.8% (or 36) were residents. At the last question, 59.2% (or 29) of respondents were residents and 40.8% (or 20) of respondents were diplomats.

Standard vs. alternative residency programmes

89.6% of those who started the questionnaire, took part in a standard residency programme. Only 10.4% of participants took part in an alternative residency programme.

Private vs. university practice

Participants were then asked at what kind of practice (the majority of) their residency takes place. 79.2% of participants answered that the majority of their programme takes place at a university practice and 20.8% answered that the majority of their programme takes place at a private practice.

Country of residency

Residents and diplomats from 15 different countries participated in this questionnaire. These countries were the United Kingdom, Belgium, France, Germany, Switzerland, Austria, Sweden, the Czech Republic, Italy, Spain, Denmark, the Netherlands, South-Africa, Australia and Ireland. Two respondents preferred not to declare their country of residency.

The next part of the results is separated in 3 sections which correspond to the three goals of the pilot-study.

- 1) Representation of the training tools, as described in the ECEIM training brochure, in the actual programme.

To find out how the training tools, as described in the ECEIM brochure were incorporated in the practical setting, the results from the document analysis and the questionnaire were compared. This was performed by means of the first goal of the pilot-study. If the brochure mentioned a training tool was applied in their programme (according to the criteria described in the document analysis), it was stated as 'applied' in table 5.

Personal information regarding participants of the questionnaire

% of participants who finished the questionnaire	63.6*
% Diplomats (start of the study)	53.2
% Residents (start of the study)	46.8
% Participants who were involved in a standard residency programme	89.6
% of participants whose programme takes place at a university practice	79.2

*Table 4: personal information of the participants of the study *% is calculated from the participants at the start of the study*

¹ 'Finished' residents have finished their residency programmes, but did not yet take or pass the final exams

The residents and diplomats who responded to the questionnaire are hereafter referred to as 'participants'. Some participants did not finish the questionnaire. Therefore, the column 'n=' was added in table 5 to illustrate the number of participants who answered a certain question.

If a participant answered that a tool was not applied in their programme, any follow-up questions related to that specific training tool, were not asked to the participant. The results of the follow-up questions are described and visualised further in this paragraph for each tool individually. The number of participants who answered each follow-up question is also presented, again with 'n='. The results of all participants combined, and for diplomats and residents separately, are presented. Diplomats are referred to as dipl. and residents as res. in the tables.

The information regarding the representation of the training tools in the ECEIM training brochure and in the actual programme is shown below the header "*the programme & the brochure*", for each training tool individually.

Training tool	Applied according to brochure	Yes (% total participants)	Yes (% of diplomats)	Yes (% of residents)	No (% of total participants)	I don't know (% of total participants)	n (all)
1. Hands-on clinical training	Yes	98.6	100.0	97.1	0.0	1.4	72
2. Direct work-up of patients	Yes	98.4	96.7	100	0.0	1.6	63
3. Primary responsibility	Yes (60% of cases)	NA	NA	NA	NA	NA	58
4. Direct diplomate supervision	Yes	98.3	100.0	96.8	1.7	0.0	60
5. Training rotations	Yes	98.3	100.0	96.8	0.0	1.7	58
6. Externship	No	57.1	48.0	64.5	35.7	7.1	56
7. Laboratory work	No	74.5	76.0	73.3	25.5	0.0	55
8. Case presentations	Yes	77.8	79.2	76.7	22.2	0.0	54
9. Journal clubs	Yes	94.3	91.3	96.7	5.7	0.0	53
10. Book clubs	Yes	56.6	69.6	46.7	41.5	1.9	53
11. Conference attendance	Yes	100.0	100.0	100.0	0.0	0.0	53
12. Conference presentation	Yes	98.1	95.7	100.0	0.0	1.9	52
13. Workshops & seminars	Yes	76.5	81.8	72.4	11.8	11.8	51
14. Research project	Yes	98.0	100.0	96.6	0.0	2.0	50
15. Publications	Yes	96.0	95.2	96.6	0.0	2.0	50
16. Clinical teaching	Yes	84.0	85.7	82.8	16.0	0.0	50
17. Case-log	Yes	100.0	100.0	100.0	0.0	0.0	50
18. Specialty specific education	No	44.9	60.0	34.5	51.0	4.1	49
19. Self-study	Yes	69.4	90.0	55.2	30.6	0.0	49
20. Review Performance	Yes	57.1	75.0	44.8	42.9	0.0	49
21. Clinically Appraised Topics	No	2.0	0.0	3.4	91.8	6.1	49
22. Multi-source Feedback	Yes	24.5	35.0	17.2	67.3	8.2	49
23. Direct Observation of Procedural Skills	Yes	14.3	35.0	0.0	79.6	6.1	49
24. Case based Discussion	Yes	61.2	85.0	44.8	34.7	4.1	49

25. Client Survey	Yes	6.1	10.0	3.4	85.7	8.2	49
26. Mini-Clinical Evaluation Exercise	Yes	14.3	35.0	0.0	75.5	10.2	49

Table 5: The training tools and the ECEIM brochure.

2) The contribution of the training tools to the personal development of the competencies of residents, as described in the CBVA framework.

To find out how much the training tools contributed to the personal development of the competencies of residents, participants were asked to select how much they felt a certain training tool contributed to the development of each of the 9 competency domains as described in the CBVE framework (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018). This was asked to reach the second goal of the pilot-study. These questions were only shown to those who had mentioned that the training tool in question was applied in their programme.

The participants had 5 options to choose from. These were ‘A great deal’, ‘A lot’, ‘A moderate amount’, ‘A little’ and ‘None at all’. The options with the highest response rate are underlined in the tables. The description of each of the nine competency domains, as mentioned earlier in the introduction, was repeatedly shown at all questions regarding the competency domains as a referral. The results of these questions are shown in tables below the header “the competency domains”, for each training tool individually.

1.1 Hands on clinical training – the programme & the brochure

98.6% of participants answered that hands on clinical training was applied in the programme. The brochure stated this as well. It specifically described that 93 weeks of the programme were spent on ‘hands on clinical training’ and 106 weeks on ‘clinical work’. That corresponds to 59,6% and 67.9% of the in total 156 weeks of the standard programme, respectively. (European College of Equine Internal Medicine, 2020)

The participants who answered that hands on clinical training was applied in their programme, were asked to estimate the percentage of time spent on hands-on clinical training within their programme. The results of this question are shown in figure 1 and table 6.

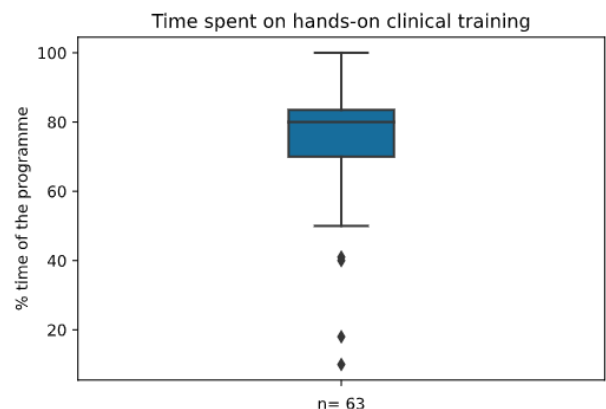


Figure 1: boxplot of the percentage of time spent on hand-on clinical training according to all participants collectively

1.2 Hands on clinical training – the competency domains

The level to which hands-on clinical training was thought to contribute to the competency domains, is shown in table 7.

	Mean	Median	SD	n =
All	74.3 %	80.0%	17.2%	63
Dipl.	74.6%	80.0%	14.5%	33
Res.	73.8%	75.0%	20.2%	30

Table 6: Estimate of the percentage of time spent on hand-on clinical training from all participants, and from diplomats and residents separately

Domains – Hands on clinical training (n=63)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	0.0	1.6	9.5	14.3	<u>74.6</u>
<i>Domain 2: Individual Animal Care</i>	0.0	0.0	3.2	14.3	<u>82.5</u>
<i>Domain 3: Animal Population Care</i>	1.6	11.1	<u>38.1</u>	30.2	19.0
<i>Domain 4: Public Health</i>	7.9	31.7	<u>38.1</u>	17.5	4.8
<i>Domain 5: Communication</i>	0.0	1.6	12.7	31.7	<u>54.0</u>
<i>Domain 6: Collaboration</i>	0.0	4.8	14.3	38.1	<u>42.9</u>
<i>Domain 7: Professionalism</i>	0.0	3.2	23.8	<u>41.3</u>	31.7
<i>Domain 8: Practice Management</i>	6.3	20.6	<u>33.3</u>	25.4	14.3
<i>Domain 9: Scholarship</i>	4.8	15.8	<u>31.7</u>	30.2	17.5

Table 7: Contribution of hands-on clinical training to each of the nine competency domains according to all participants, collectively

2.1 Direct work up of patients – the programme & the brochure

The vast majority (98.6%) of participants answered that their training programme involved the direct work up of patients. This is in line with the brochure, which described that the direct work-up of equine internal medicine patients is essential to acquire specialist knowledge. Residents must also log these cases to ensure that they have seen a sufficient case load at the end of their residency (European College of Equine Internal Medicine, 2020).

Participants who answered that the direct work up of patients was applied in their programme, were then asked how many cases a resident had to work up on a weekly basis, on average. Results are visualised in table 8 and figure 2. The answers varied between 2 and 25 cases per week, with a mean of 11.7 cases.

2.2 Direct work up of patients – the competency domains

The level to which the direct work up of patients was thought to contribute to the competency domains, is shown in table 9.

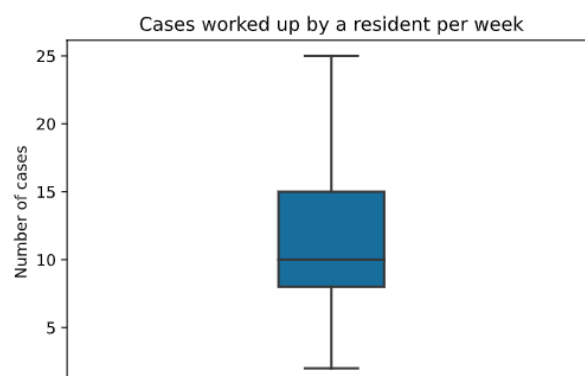


Figure 2: boxplot of the total number of cases worked up by a resident per week according to all participants collectively

	Mean	Median	SD	n =
All	11.7	10.0	5.2	60
Dipl.	12.3	10.0	5.3	30
Res.	11.1	10.0	5.1	30

Table 8: Number of cases that a resident works up on a weekly basis according to all participants, and to diplomats and residents separately

Domains – Direct work up of patients (n=60)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	0.0	0.0	1.7	11.7	<u>86.7</u>
<i>Domain 2: Individual Animal Care</i>	0.0	0.0	3.3	16.7	<u>80.0</u>
<i>Domain 3: Animal Population Care</i>	1.7	18.3	<u>33.3</u>	28.3	18.3
<i>Domain 4: Public Health</i>	6.7	26.7	<u>43.3</u>	18.3	5.0
<i>Domain 5: Communication</i>	0.0	3.3	11.7	28.3	<u>56.7</u>
<i>Domain 6: Collaboration</i>	0.0	3.3	18.3	<u>45.0</u>	33.3
<i>Domain 7: Professionalism</i>	0.0	3.3	20.0	<u>46.7</u>	30.0
<i>Domain 8: Practice Management</i>	3.3	16.7	<u>40.0</u>	28.3	11.7
<i>Domain 9: Scholarship</i>	0.0	20.0	<u>33.3</u>	30.0	16.7

Table 9: Contribution of the direct work up of patients to each of the nine competency domains according to all participants, collectively

3.1 Resident has primary responsibility in majority of cases – the programme & the brochure

In the questionnaire, we asked the participants to estimate the percentage of cases in which they had primary responsibility. Results of this question are shown in figure 3 and table 10.

According to the brochure, the ECEIM resident should take primary clinical responsibility in at least 60% of cases (European College of Equine Internal Medicine, 2020).

3.2 Resident has primary responsibility in majority of cases – the competency domains

The level to which the residents’ responsibility for the majority of cases was thought to contribute to the competency domains, is shown in table 11.



Figure 3: boxplot of the percentage of cases in which the resident has primary responsibility.

	Mean	Median	SD	n =
All	62.2%	64.0%	26.2%	58
Dipl.	62.2%	63.5%	26.3%	28
Res.	62.1%	65.5%	27.2%	30

Table 10: percentage of cases in which the resident has primary responsibility according to all participants, and to diplomats and residents separately

Domains – Primary responsibility of cases (n=58)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
<i>Domain 1: Clinical reasoning</i>	1.7	0.0	3.4	19.0	<u>75.9</u>
<i>Domain 2: Individual Animal Care</i>	1.7	0.0	5.2	17.2	<u>75.9</u>
<i>Domain 3: Animal Population Care</i>	1.7	17.2	25.9	<u>34.4</u>	20.7
<i>Domain 4: Public Health</i>	6.9	25.9	<u>31.0</u>	29.3	6.9
<i>Domain 5: Communication</i>	1.7	0.0	5.2	29.3	<u>63.8</u>
<i>Domain 6: Collaboration</i>	1.7	0.0	17.2	<u>41.4</u>	39.6
<i>Domain 7: Professionalism</i>	1.7	1.7	15.5	<u>39.7</u>	41.4
<i>Domain 8: Practice Management</i>	3.4	13.8	<u>31.0</u>	29.3	22.4
<i>Domain 9: Scholarship</i>	3.4	19.0	24.1	<u>36.2</u>	17.2

Table 11: Contribution of the primary responsibility of cases to each of the nine competency domains according to all participants, collectively

4.1 Direct diplomate supervision – the programme & the brochure

By 'direct diplomate supervision', it was meant that a certified diplomate is available (on location) for consultation. 98.3 % of participants said that such direct diplomate supervision occurred in their programme. Participants who answered that this direct diplomate supervision occurred in their programme were asked to estimate what percentage of the clinical training time is spent under direct diplomate supervision. The brochure described that all logged cases must have been seen in direct consultation with an ECEIM diplomate, or a diplomate from a different specialty. (European College of Equine Internal Medicine, 2020).

Participants who answered that a part of their programme was spent under direct diplomate supervision were asked to estimate the percentage of time spent under this supervision. Results of this question are shown in figure 4 and table 12

4.2 Direct diplomate supervision – the competency domains
The level to which direct diplomate supervision was thought to contribute to the competency domains, is shown in table 13.

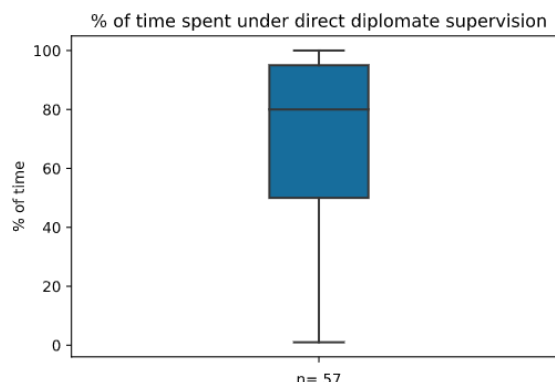


Figure 4: boxplot of the percentage of time of the training programme spent under direct diplomate supervision according to all participants collectively

	Mean	Median	SD	n =
All	73.2 %	80.0%	26.3%	57
Dipl.	79.9%	84.0%	18.8%	27
Res.	67.2%	70.0%	30.1%	30

Table 12: the percentage of time of the training programme spent under direct diplomate supervision according to all participants, and to diplomats and residents separately

Domains – Direct diplomate supervision (n=57)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	0.0	0.0	5.2	12.3	<u>82.5</u>
<i>Domain 2: Individual Animal Care</i>	0.0	0.0	8.8	19.3	<u>71.9</u>
<i>Domain 3: Animal Population Care</i>	0.0	12.3	21.1	29.8	<u>36.8</u>
<i>Domain 4: Public Health</i>	0.0	22.8	<u>26.3</u>	<u>26.3</u>	24.5
<i>Domain 5: Communication</i>	0.0	7.0	15.8	24.6	<u>52.6</u>
<i>Domain 6: Collaboration</i>	0.0	1.8	19.3	14.0	<u>64.9</u>
<i>Domain 7: Professionalism</i>	0.0	7.0	15.8	31.6	<u>45.6</u>
<i>Domain 8: Practice Management</i>	3.5	17.5	<u>29.8</u>	19.3	<u>29.8</u>
<i>Domain 9: Scholarship</i>	0.0	8.8	21.1	24.6	<u>45.6</u>

Table 13: Contribution of direct diplomate supervision to each of the nine competency domains according to all participants, collectively

5.1 Training rotations – the programme & the brochure

Participants were asked if training rotations in related disciplines and training units were part of their programme. A majority of 98.2% answered yes. Those who answered that training rotations were part of their programme were then asked how many weeks of the entire programme were spent on it in total. Results of this question are shown in table 14 and figure 5. The brochure specified that two weeks must be spent on anaesthesiology, two on clinical and two on gross pathology, four on diagnostic imaging and three on emergency, critical, and neonatal care. That would make up 13 weeks in total. These weeks of rotations in supportive disciplines are supposed to be spent in direct contact with an EBVS diplomate of that specific discipline and on conferences or seminars of that specific discipline (European College of Equine Internal Medicine, 2020).

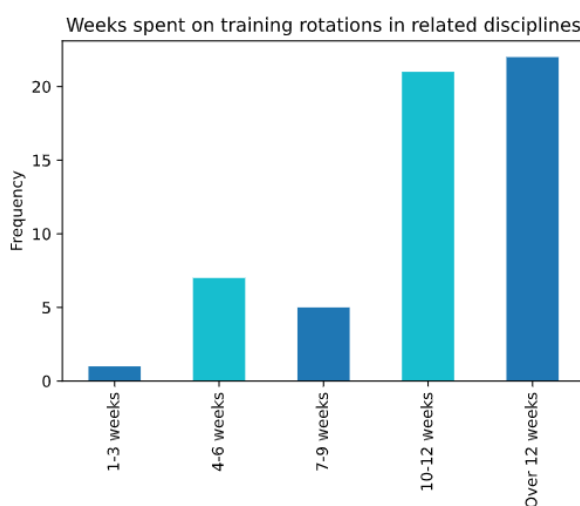


Figure 5: bar chart of the number of weeks spent on training rotations in related disciplines, over the course of the entire programme. The collective data of participants who answered this question is shown (n=56)

5.2 Training rotations – the competency domains

The level to which training rotations were thought to contribute to the competency domains, is shown in table 15.

Weeks spent on training rotations, over the course of the entire programme	% all (n=56)	% dipl. (n=26)	% res. (n=30)
1-3 weeks	1.8	0.0	3.3
4-6 weeks	12.5	19.2	6.7
7-9 weeks	8.9	7.7	10.0
10-12 weeks	37.5	42.3	33.3
Over 12 weeks	39.3	30.8	46.7

Table 14: the number of weeks spent on training rotations over the course of the entire programme. Data is shown for all participants collectively, and for diplomats and residents separately

Domains – Training rotations (n=56)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	0.0	0.0	21.4	30.4	<u>48.2</u>
<i>Domain 2: Individual Animal Care</i>	0.0	1.8	30.6	32.1	<u>35.7</u>
<i>Domain 3: Animal Population Care</i>	1.8	<u>32.1</u>	25.0	19.6	21.4
<i>Domain 4: Public Health</i>	7.1	28.6	<u>33.9</u>	21.4	8.9
<i>Domain 5: Communication</i>	0.0	14.3	<u>32.1</u>	26.8	26.8
<i>Domain 6: Collaboration</i>	0.0	3.6	16.1	28.6	<u>51.8</u>
<i>Domain 7: Professionalism</i>	1.8	1.8	23.2	35.7	<u>37.5</u>
<i>Domain 8: Practice Management</i>	17.9	<u>35.7</u>	30.5	12.5	3.6
<i>Domain 9: Scholarship</i>	0.0	14.3	28.6	<u>30.6</u>	26.8

Table 15: Contribution of training rotations to each of the nine competency domains according to all participants, collectively

6.1 Externships – the programme & the brochure

57.14 % of participants said that externships were part of their programme. It was specified in the questionnaire that this question regards externships in the residents’ own field of specialty. Externships are not mandatory or specifically mentioned in the ECEIM brochure.

Participants who answered that externships were indeed part of their programme were then asked how many weeks of the entire programme were spent on it. Results of this question are shown in table 16 and figure 6.

6.2 Externships – the competency domains

The level to which externships were thought to contribute to the competency domains, is shown in table 17.

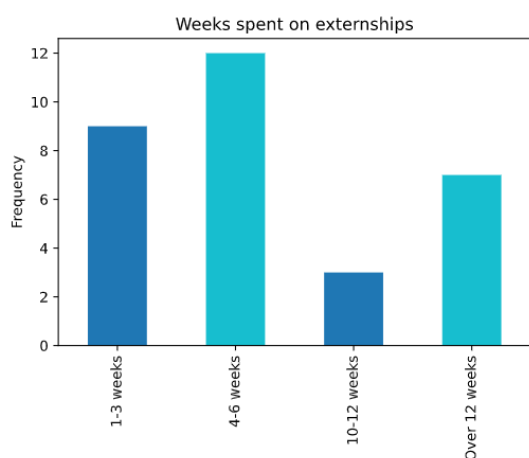


Figure 6: bar chart of the number of weeks spent on externships, over the course of the entire programme. Collective data of participants who answered this question is shown (n=31)

Weeks spent on externships over the course of the entire programme	% all (n=31)	% dipl. (n=12)	% res. (n=19)
1-3 weeks	29.0	41.7	21.1
4-6 weeks	38.7	41.7	36.8
7-9 weeks	0.0	0.0	0.0
10-12 weeks	9.7	8.3	10.5
Over 12 weeks	22.6	8.3	31.6

Table 16: the number of weeks spent on externships over the course of the entire programme. Data is shown for all participants collectively, and for diplomats and residents separately

Domains – Externships (n=31)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
<i>Domain 1: Clinical reasoning</i>	0.0	3.2	9.7	29.0	<u>58.1</u>
<i>Domain 2: Individual Animal Care</i>	0.0	6.5	9.7	32.3	<u>51.6</u>
<i>Domain 3: Animal Population Care</i>	3.2	22.6	25.8	16.1	<u>32.3</u>
<i>Domain 4: Public Health</i>	3.2	29.0	<u>32.3</u>	19.4	16.1
<i>Domain 5: Communication</i>	0.0	3.2	16.1	19.4	<u>61.3</u>
<i>Domain 6: Collaboration</i>	0.0	0.0	6.5	19.4	<u>74.2</u>
<i>Domain 7: Professionalism</i>	0.0	0.0	9.7	38.8	<u>51.6</u>
<i>Domain 8: Practice Management</i>	3.2	<u>38.7</u>	29.0	16.1	12.9
<i>Domain 9: Scholarship</i>	0.0	6.5	29.0	22.6	<u>41.9</u>

Table 17: Contribution of externships to each of the nine competency domains according to all participants, collectively

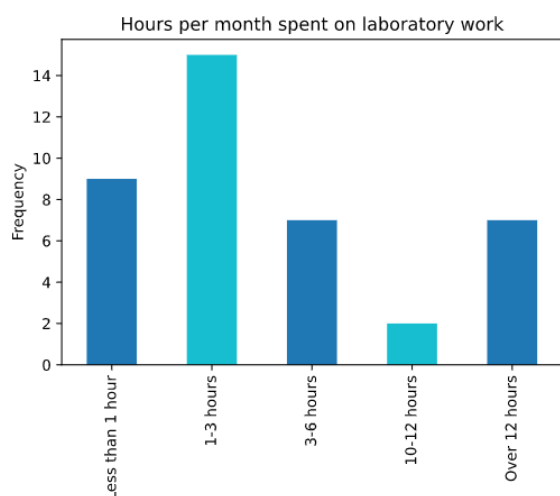
7.1 Laboratory work – the programme & the brochure

74.5% of participants answered that laboratory work was part of their residency programme. Laboratory work was not specifically mentioned in the training brochure as part of the programme. Nonetheless, the interpretation of laboratory data was mentioned to be part of the exam (European College of Equine Internal Medicine, 2020).

Participants who answered that laboratory work was part of their residency programme were then asked how many hours per month were spent on it. Results of this question are shown in table 18 and figure 7.

7.2 Laboratory work – the competency domains

The level to which laboratory work was thought to contribute to the competency domains, is shown in table 19.



Hours spent on laboratory work per month	% all (n=40)	% dipl. (n=18)	% res. (n=22)
Less than 1 hour	22.5	11.1	31.8
1-3 hours	37.5	44.4	31.8
3-6 hours	17.5	22.2	13.6
7-9 hours	0.0	0.0	0.0
10-12 hours	5.0	5.6	4.5
Over 12 hours	17.5	16.7	18.2

Table 18: Hours per month that the resident spends on laboratory work, according to the data of all participants collectively, and of diplomats and residents separately

Figure 7: bar chart of the number of hours per month that the resident spends on laboratory work. Collective data of participants who answered this question is shown (n=40)

Domains – Laboratory work (n=40)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
Domain 1: Clinical reasoning	0.0	17.5	25.0	27.5	<u>30.0</u>
Domain 2: Individual Animal Care	2.5	15.0	25.0	<u>30.0</u>	27.5
Domain 3: Animal Population Care	10.0	<u>32.5</u>	27.5	12.5	17.5
Domain 4: Public Health	15.0	<u>35.0</u>	25.0	17.5	7.5
Domain 5: Communication	17.5	<u>42.5</u>	20.0	15.0	5.0
Domain 6: Collaboration	7.5	<u>37.5</u>	25.0	20.0	10.0

<i>Domain 7: Professionalism</i>	5.0	25.0	<u>50.0</u>	15.0	5.0
<i>Domain 8: Practice Management</i>	25.0	<u>42.5</u>	30.0	2.5	0.0
<i>Domain 9: Scholarship</i>	7.5	20.0	<u>42.5</u>	20.0	10.0

Table 19: Contribution of laboratory work to each of the nine competency domains according to all participants, collectively

8.1 Case presentations – the programme & the brochure

77.8 % of the participants stated that residents give case presentations during their programme. The ECEIM brochure itself did not have a set number of case presentations that the resident is supposed to present. More specifically, it was not even marked as a mandatory part of the programme. It was mentioned that case presentations are useful as an assessment tool to test a resident's knowledge, however (European College of Equine Internal Medicine, 2020).

The participants who answered that giving case presentations was indeed applied in their programme were then asked to estimate the number of case presentations given by a resident on an annual basis. Results of this question are shown in table 20 and figure 8.

8.2 Case presentations – the competency domains

The level to which case presentations were thought to contribute to the competency domains, is shown in table 21.

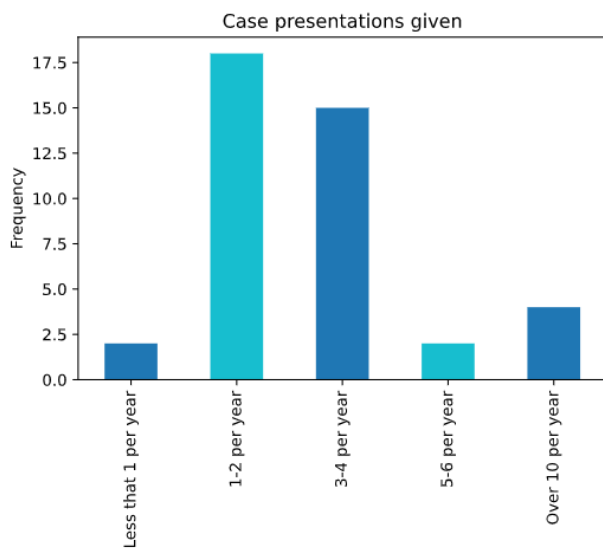


Figure 8: bar chart of the number case presentations given by the resident on an annual basis. Collective data of participants who answered this question is shown (n=41)

Case presentations given annually	% all (n=41)	% dipl. (n=18)	% res. (n=23)
Less than 1 per year	4.9	0.0	8.7
1-2 per year	43.9	50	39.1
3-4 per year	36.5	38.9	34.8
5-6 per year	4.9	5.6	4.3
7-8 per year	0.0	0.0	0.0
8-9 per year	0.0	0.0	0.0
Over 10 per year	9.8	5.6	13.0

Table 20: number of case presentations given by the resident on an annual basis according to the data of all participants collectively, and of diplomats and residents separately

Domains – Case presentations (n=41)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	0.0	4.9	34.1	19.5	<u>41.5</u>
<i>Domain 2: Individual Animal Care</i>	0.0	9.8	<u>41.5</u>	19.5	29.3
<i>Domain 3: Animal Population Care</i>	4.9	<u>39.0</u>	31.7	12.2	12.2
<i>Domain 4: Public Health</i>	19.5	<u>41.5</u>	26.8	7.3	4.9
<i>Domain 5: Communication</i>	0.0	7.3	9.8	24.4	<u>58.5</u>
<i>Domain 6: Collaboration</i>	0.0	19.5	<u>29.3</u>	<u>29.3</u>	19.5
<i>Domain 7: Professionalism</i>	0.0	9.8	26.8	29.3	<u>34.1</u>
<i>Domain 8: Practice Management</i>	41.4	<u>43.9</u>	9.8	2.4	2.4
<i>Domain 9: Scholarship</i>	4.9	2.4	9.8	39.0	<u>43.9</u>

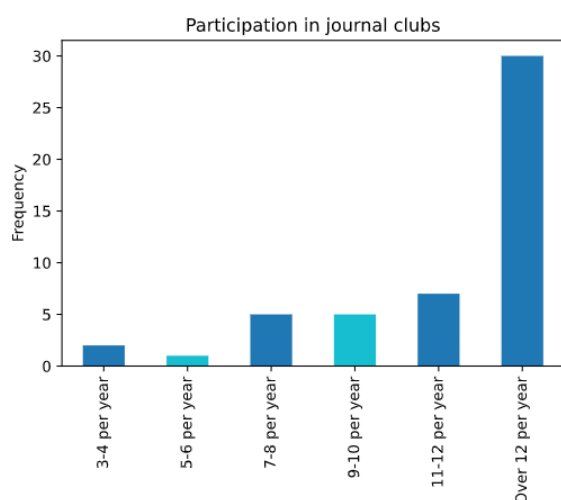
Table 21: Contribution to each of the nine competency domains for giving case presentation according to all participants, collectively

9.1 Journal clubs – the programme & the brochure

Taking part in journal clubs was applied in 94.3% of the participants’ programmes. The brochure did not state participation in journal clubs to be mandatory. It was, however, recommended as an addition to self-study. Furthermore, Journal clubs were said to be useful as an assessment tool (European College of Equine Internal Medicine, 2020). Participants who answered that journal clubs were part of their programme were asked how many journal clubs a resident participates in, on an annual basis. Results of this question are shown in table 22 and figure 9.

9.2 Journal clubs – the competency domains

The level to which journal clubs were thought to contribute to the competency domains, is shown in table 23.



Annual participation in journal clubs	% all (n=50)	% dipl. (n=21)	% res. (n=29)
1-2 per year	0.0	0.0	0.0
3-4 per year	4.0	0.0	6.9
5-6 per year	2.0	0.0	3.4
7-8 per year	10.0	4.8	13.8
9-10 per year	10.0	0.0	17.2
11-12 per year	14.0	14.3	13.8
Over 12 per year	60.0	80.1	44.8

Table 22: the number of journal clubs that a resident participates in on an annual basis according to the data of all participants collectively, and of diplomats and residents separately

Figure 9: bar chart of the number of journal clubs that the resident attends on an annual basis. Collective data of participants who answered this question is shown (n=50)

Domains – Journal clubs (n=50)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	2.0	4.0	22.0	<u>40.0</u>	32.0
<i>Domain 2: Individual Animal Care</i>	0.0	10.0	<u>34.0</u>	30.0	26.0
<i>Domain 3: Animal Population Care</i>	4.0	12.0	<u>34.0</u>	26.0	24.0
<i>Domain 4: Public Health</i>	4.0	<u>32.0</u>	30.0	18.0	16.0
<i>Domain 5: Communication</i>	2.0	16.0	20.0	20.0	<u>42.0</u>
<i>Domain 6: Collaboration</i>	2.0	24.0	<u>32.0</u>	16.0	26.0
<i>Domain 7: Professionalism</i>	4.0	16.0	<u>28.0</u>	26.0	26.0
<i>Domain 8: Practice Management</i>	38.0	<u>44.0</u>	10.0	4.0	4.0
<i>Domain 9: Scholarship</i>	2.0	4.0	12.0	26.0	<u>56.0</u>

Table 23: Contribution of participation in journal clubs to each of the nine competency domains according to all participants, collectively

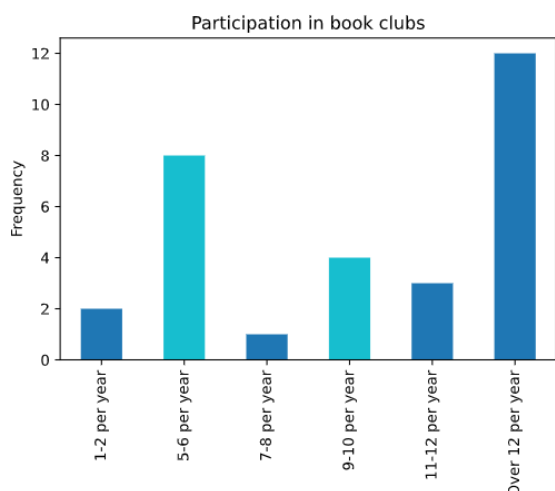
10.1 Book clubs – the programme & the brochure

56.6% of participants said that book clubs or book discussion groups were part of their residency programme. Similar to journal clubs, book reading clubs were not mandatory, but recommended as an addition to self-study (European College of Equine Internal Medicine, 2020).

Participants who said that book discussion groups were part of their residency programme, were then asked how often a resident attends such group meetings. The results of this question are shown in table 24 and figure 10.

10.2 Book clubs – the competency domains

The level to which book clubs were thought to contribute to the competency domains, is shown in table 25.



Annual participation in book clubs	% all (n=30)	% dipl. (n=16)	% res. (n=14)
1-2 per year	6.7	6.3	7.1
2-3 per year	0.0	0.0	0.0
3-4 per year	0.0	0.0	0.0
5-6 per year	26.7	25.0	28.6
7-8 per year	3.6	6.3	0.0
9-10 per year	13.3	6.3	21.4
11-12 per year	10.0	12.5	7.1
Over 12 per year	40.0	43.8	35.7

Table 24: the number of book clubs that a resident participates in on an annual basis according to the data of all participants collectively, and of diplomats and residents separately

Figure 10: bar chart of the number of journal clubs that the resident attends on an annual basis. Collective data of participants who answered this question is shown (n=30)

Domains – Book clubs (n=30)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
Domain 1: Clinical reasoning	0.0	0.0	30.0	33.3	<u>36.6</u>
Domain 2: Individual Animal Care	0.0	3.3	26.7	<u>43.3</u>	26.7
Domain 3: Animal Population Care	0.0	6.7	<u>53.3</u>	13.3	26.7
Domain 4: Public Health	0.0	30.0	<u>33.3</u>	20.0	16.7
Domain 5: Communication	3.3	13.3	33.3	<u>36.7</u>	13.3
Domain 6: Collaboration	3.3	23.3	16.7	<u>40.0</u>	16.7
Domain 7: Professionalism	3.3	13.3	33.3	<u>36.7</u>	13.3
Domain 8: Practice Management	40.0	<u>43.3</u>	6.7	6.7	3.3
Domain 9: Scholarship	3.3	0.0	20.0	30.0	<u>46.7</u>

Table 25: Contribution of participation in book clubs to each of the nine competency domains according to all participants, collectively

11.1 Conference attendance – the programme & the brochure

All participants stated that conference attendance is part of their training programme. The training brochure mentioned conference attendance to be obligatory, with a minimum attendance of three major conferences during the residency. The brochure required these conferences to be either national or international. In addition, they had to encompass relevant equine internal medicine content (European College of Equine Internal Medicine, 2020).

The number of national and international conferences attended by a resident was asked thereafter. Results of this question are shown in table 26 and 27 and in figure 11.

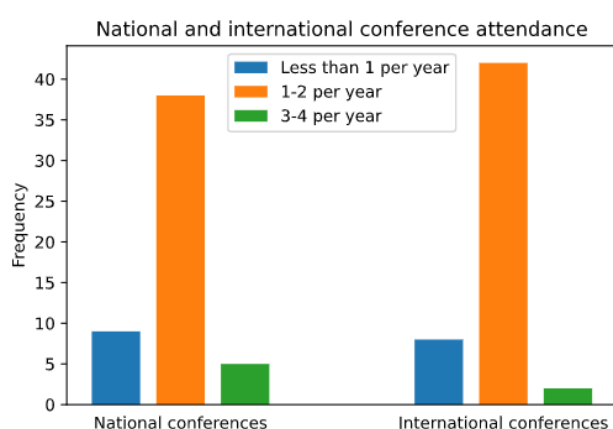


Figure 11: bar chart of the number of national and international conferences a resident attends on an annual basis. The collective data of participants who answered this question is shown (n=52)

Number of national conferences	National conferences % all (n=52)	National conferences % dipl. (n=23)	National conferences % res. (n=29)
Less than 1 per year	17.3	8.7	24.1
1-2 per year	73.1	82.6	65.5
3-4 per year	9.6	8.7	10.3
5-6 per year	0.0	0.0	0.0
Over 6 per year	0.0	0.0	0.0

Table 26: the number of national conferences that a resident attends on an annual basis according to the data of all participants collectively, and of diplomats and residents separately

Number of international conferences	International conferences % all (n=52)	International conferences % dipl. (n=23)	International conferences % res. (n=29)
Less than 1 per year	15.4	21.7	10.3
1-2 per year	80.8	78.3	82.8
3-4 per year	3.8	0.0	6.9
5-6 per year	0.0	0.0	0.0
Over 6 per year	0.0	0.0	0.0

Table 27: the number of international conferences that a resident attends on an annual basis according to the data of all participants collectively, and of diplomats and residents separately

11.2 Conference attendance – the competency domains

The level to which conference attendance was thought to contribute to the competency domains, is shown in table 28.

Domains – Conference attendance (n=52)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
Domain 1: Clinical reasoning	0.0	9.6	<u>34.6</u>	32.7	23.1
Domain 2: Individual Animal Care	0.0	5.8	<u>48.1</u>	34.6	11.5
Domain 3: Animal Population Care	1.9	13.5	<u>44.2</u>	30.8	9.6
Domain 4: Public Health	5.8	25.0	<u>42.3</u>	17.3	9.6
Domain 5: Communication	1.9	5.8	<u>32.7</u>	26.9	<u>32.7</u>
Domain 6: Collaboration	1.9	3.8	23.1	34.6	<u>36.5</u>

<i>Domain 7: Professionalism</i>	1.9	1.9	13.5	36.5	<u>46.2</u>
<i>Domain 8: Practice Management</i>	26.9	<u>42.3</u>	23.1	1.9	5.8
<i>Domain 9: Scholarship</i>	0.0	7.7	17.3	32.7	<u>42.3</u>

Table 28: Contribution of the attendance of conferences to each of the nine competency domains according to all participants, collectively

12.1 Conference presentation – the programme & the brochure

98.1% of participants indicated that residents gave presentations at conferences during the programme. The brochure described that the resident is required to give at least six seminars or presentations to a professional audience during their training, of which three must take place outside their own faculty. The presentations must be scientific and followed by a discussion period (European College of Equine Internal Medicine, 2020). In the questionnaire, the description ‘conference’ was used to ensure the participants were speaking of scientific seminars given to a ‘professional audience’ upon answering. Giving seminars to veterinary students for teaching purposes for example, do not count.

The participants who answered that residents give presentations at conferences during the programme, were then asked how many presentations were given by a resident at national and international conferences, over the whole course of the residency. The results of this question are shown in table 29 and 30 and in figure 12.

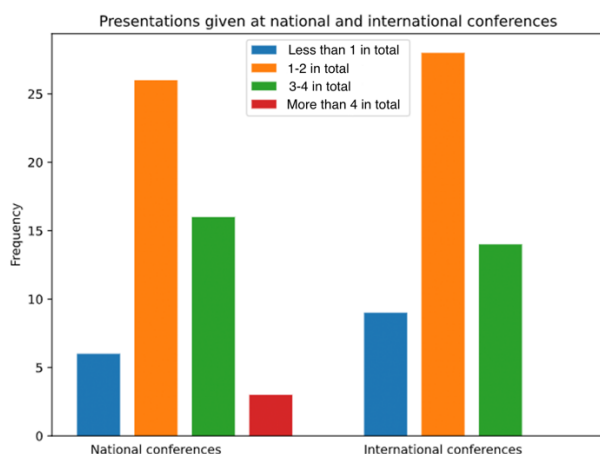


Figure 12: bar chart of the number of presentations given by the resident on national and international. The collective data of participants who answered this question is shown (n=51).

Number of presentations at national conferences	National conferences % all (n=51)	National conferences % dipl. (n=22)	National conferences % res. (n=29)
Less than 1 in total	11.8	13.6	10.3
1-2 in total	51.0	54.5	48.3
3-4 in total	31.4	31.8	31.0
More than 4 in total	5.9	0.0	10.3

Table 29: the number of presentations given on national conferences by a resident annually, according to the data of all participants collectively, and of diplomats and residents separately

Number of presentations at international conferences	International conferences % all (n=51)	International conferences % dipl. (n=22)	International conferences % res. (n=29)
Less than 1 in total	17.6	18.2	17.2
1-2 in total	54.9	63.6	48.3
3-4 in total	27.5	18.2	34.5
More than 4 in total	0.0	0.0	0.0

Table 30: the number of presentations given on international conferences by a resident annually, according to the data of all participants collectively, and of diplomats and residents separately

12.2 Conference presentation – the competency domains

The level to which conference presentations was thought to contribute to the competency domains, is shown in table 31.

Domains – Conference presentation (n=51)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
<i>Domain 1: Clinical reasoning</i>	7.8	27.5	<u>37.3</u>	15.7	11.8
<i>Domain 2: Individual Animal Care</i>	9.8	27.5	<u>43.1</u>	11.8	7.8
<i>Domain 3: Animal Population Care</i>	13.7	27.5	<u>41.2</u>	9.8	7.8
<i>Domain 4: Public Health</i>	15.7	<u>37.3</u>	31.4	9.8	5.9
<i>Domain 5: Communication</i>	0.0	2.0	3.9	19.6	<u>74.5</u>
<i>Domain 6: Collaboration</i>	3.9	3.9	13.7	29.4	<u>49.0</u>
<i>Domain 7: Professionalism</i>	0.0	3.9	7.8	23.5	<u>64.7</u>
<i>Domain 8: Practice Management</i>	<u>45.1</u>	33.3	13.7	1.9	5.9
<i>Domain 9: Scholarship</i>	2.0	0.0	15.7	31.4	<u>51.0</u>

Table 31: Contribution of giving presentations at conferences to each of the nine competency domains according to all participants, collectively

13.1 Workshops & Seminars – the programme & the brochure

76.5% of participants answered that their residency programme involved the attendance of workshops, seminars and (listening to) case presentations. In the brochure, it is written that residents are required to attend at least five hours per week of hospital rounds and resident seminars during clinical rotations. Engagement in case presentations, however, is not mandatory. It was, however, described as a helpful addition to self-study and it may assist the resident in acquiring essential knowledge (European College of Equine Internal Medicine, 2020).

The annual frequency of the workshops, seminars and case presentations were also asked. Results regarding this frequency are visualised in table 32, 33, 34 and figure 13

Number of workshops annually	% all (n=38)	% dipl. (n=17)	% res. (n=21)
Less than 1 per year	44.7	52.9	38.1
1-2 per year	39.5	35.3	42.9
3-4 per year	7.9	0.0	14.3
5-6 per year	2.6	5.9	0.0
Over 6 per year	5.3	5.9	4.8

Table 32: number of workshops that a resident attends on an annual basis according to the data of all participants collectively, and of diplomats and residents separately

Number of seminars annually	% all (n=38)	% dipl. (n=17)	% res. (n=21)
Less than 1 per year	23.7	5.9	38.1
1-2 per year	39.5	47.1	33.3
3-4 per year	10.5	5.9	14.3
5-6 per year	5.3	11.8	0.0
Over 6 per year	21.1	29.4	14.3

Table 33: number of seminars that a resident attends on an annual basis according to the data of all participants collectively, and of diplomats and residents separately

Number of case presentations annually	% all (n=38)	% dipl. (n=17)	% res. (n=21)
Less than 1 per year	15.8	5.9	23.8
1-2 per year	15.8	17.6	14.3
3-4 per year	18.4	17.6	19.0
5-6 per year	15.8	23.5	9.5
Over 6 per year	34.2	35.3	33.3

Table 34: number of case presentations that a resident attends on an annual basis according to the data of all participants collectively, and of diplomats and residents separately

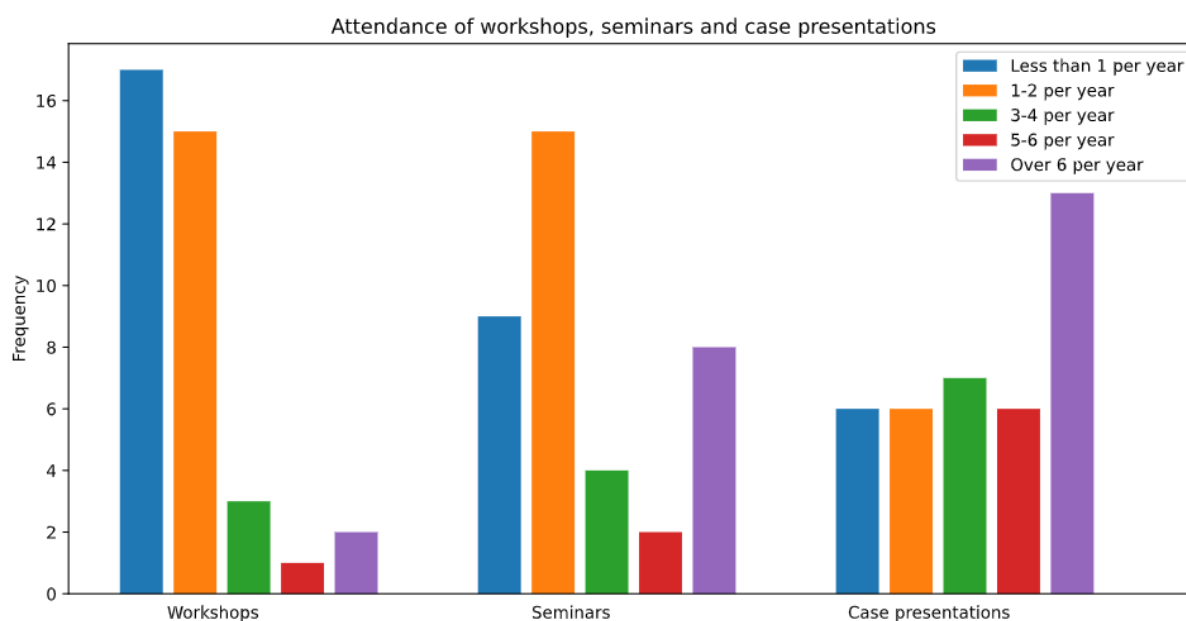


Figure 13: bar chart of the number of workshops, seminars, and case presentations a resident attends on an annual basis. The collective data of participants who answered this question is shown (n=38)

13.1 Workshops & Seminars – the competency domains

The level to which workshops and seminars were thought to contribute to the competency domains, is shown in table 35.

Domains – Workshops & seminars (n=38)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
<i>Domain 1: Clinical reasoning</i>	0.0	2.6	26.3	<u>42.1</u>	28.9
<i>Domain 2: Individual Animal Care</i>	0.0	5.3	23.7	<u>47.4</u>	23.7
<i>Domain 3: Animal Population Care</i>	0.0	28.9	21.1	<u>39.5</u>	10.5
<i>Domain 4: Public Health</i>	7.9	<u>36.8</u>	31.6	18.4	5.3
<i>Domain 5: Communication</i>	0.0	13.2	26.3	<u>31.6</u>	28.9

<i>Domain 6: Collaboration</i>	2.6	2.6	28.9	<u>44.7</u>	21.1
<i>Domain 7: Professionalism</i>	5.3	2.6	26.3	<u>42.1</u>	23.7
<i>Domain 8: Practice Management</i>	23.7	<u>42.1</u>	26.3	2.6	5.3
<i>Domain 9: Scholarship</i>	0.0	7.9	23.7	31.6	<u>36.8</u>

Table 35: Contribution of attendance of workshops, seminars and case presentations to each of the nine competency domains according to the collective data of all participants

14.1 Research project – the programme & the brochure

A research project was said to be part of 98.0% of participants' programmes. The brochure describes that the ECEIM has the aim to increase knowledge and skills of the resident regarding conceptualising, executing and applying research. It specifically stated that a minimum of 4 weeks per year (or 12 in total) must be spent on research (European College of Equine Internal Medicine, 2020). That would be 7.6% of the programme, in total.

Participants were then asked to estimate the time a resident spends on research, as a percentage of the entire program. Results of this question are shown in figure 14 and table 36.

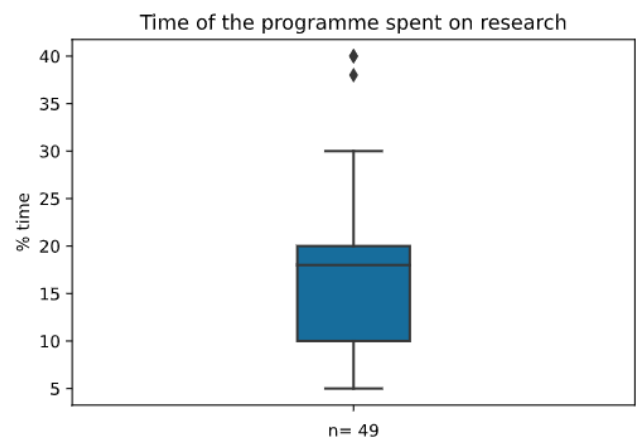


Figure 14: boxplot of the percentage of time of the entire programme, which is spent on research, as estimated by all participants who answered this question

14.1 Research project – the competency domains

The level to which doing a research project was thought to contribute to the competency domains, is shown in table 37.

	Mean	Median	SD	n =
All	17.6%	18.0%	8.8%	49
Dipl.	15.7%	15.0%	5.4%	21
Res.	18.9%	20.0%	10.5%	28

Table 36: the percentage of time of the entire programme, which is spent on research, according to the data of all participants collectively, and of diplomats and residents separately

Domains – Research project (n=49)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
<i>Domain 1: Clinical reasoning</i>	10.2	30.6	<u>38.8</u>	14.3	6.1
<i>Domain 2: Individual Animal Care</i>	10.2	<u>44.9</u>	32.7	6.1	6.1
<i>Domain 3: Animal Population Care</i>	8.2	36.7	<u>36.7</u>	12.2	6.1
<i>Domain 4: Public Health</i>	20.4	<u>32.7</u>	28.6	6.1	12.2
<i>Domain 5: Communication</i>	2.0	10.2	24.5	<u>34.7</u>	28.6
<i>Domain 6: Collaboration</i>	0.0	4.1	12.2	36.7	<u>46.9</u>

<i>Domain 7: Professionalism</i>	4.1	2.0	16.3	<u>38.8</u>	<u>38.8</u>
<i>Domain 8: Practice Management</i>	<u>36.7</u>	34.7	22.4	0.0	6.1
<i>Domain 9: Scholarship</i>	2.0	0.0	18.4	34.7	<u>44.9</u>

Table 37: Contribution of doing a research project to each of the nine competency domains according to the collective data of all participants

15.1 Publications – the programme & the brochure

96.0% of participants indicated that residents had to publish scientific papers during their programme. According to the brochure, residents were required to publish either one first author research paper, a large case series (with at least 20 cases) or a scientific short communication. In addition, the resident had to publish a first author case report, a small case series (with less than 20 cases) or another research paper.

The participants who answered that residents must publish scientific papers during their programme, were then asked to fill in the number and type of publications a resident is expected to have at the end of their residency. The distribution of these number of publications per publication type is shown in table 38, 39 and 40 and in figure 15.

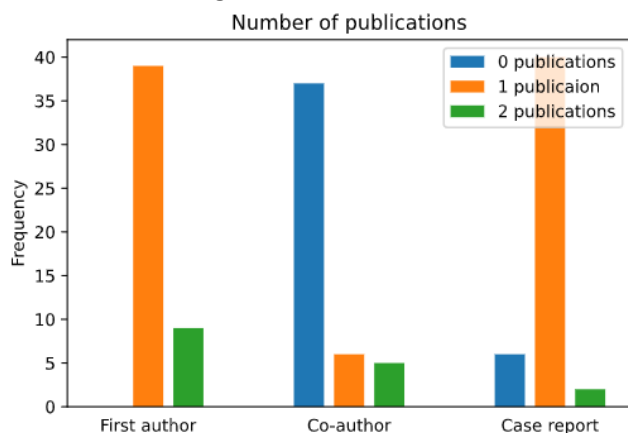


Figure 15: bar chart of the number of the number of workshops, seminars, and case presentations a resident attends on an annual basis. The collective data of participants who answered this question is shown (n=48)

15.2 Publications – the competency domains

The level to which working on publications was thought to contribute to the competency domains, is shown in table 41.

Number of publications of a research paper as first author	% all (n=48)	% dipl. (n=20)	% res. (n=28)
0	0.0	0.0	0.0
1	81.25	75.0	85.7
2	18.75	25.0	14.3

Table 38: the number of publications of a research paper that residents must publish as first author according to the data of all participants collectively, and of diplomats and residents separately

Number of publications of a research paper as co-author	% all (n=48)	% dipl. (n=20)	% res. (n=28)
0	77.1	70.0	82.1
1	12.5	15.0	10.7
2	10.4	15.0	7.1

Table 39: the number of publications of a research paper that residents must publish as co-author according to the data of all participants collectively, and of diplomats and residents separately

Number of publications as first author of a case report	% all (n=48)	% dipl. (n=20)	% res. (n=28)
0	12.5	10.0	14.3
1	83.3	85.0	82.1
2	4.2	5.0	3.6

Table 40: the number of case reports that residents must publish as first author according to the data of all participants collectively, and of diplomats and residents separately

Domains – Publications (n=48)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	12.5	25.0	<u>35.4</u>	22.9	4.2
<i>Domain 2: Individual Animal Care</i>	16.7	27.1	<u>45.8</u>	8.3	2.1
<i>Domain 3: Animal Population Care</i>	12.5	<u>41.7</u>	33.3	8.3	4.2
<i>Domain 4: Public Health</i>	18.8	<u>43.8</u>	25.0	8.3	4.2
<i>Domain 5: Communication</i>	0.0	6.3	22.9	31.3	<u>39.6</u>
<i>Domain 6: Collaboration</i>	0.0	4.2	10.4	<u>43.8</u>	41.7
<i>Domain 7: Professionalism</i>	4.4.2	2.1	14.6	<u>39.6</u>	<u>39.6</u>
<i>Domain 8: Practice Management</i>	<u>52.1</u>	27.1	14.6	2.1	4.2
<i>Domain 9: Scholarship</i>	0.0	2.1	18.8	29.2	<u>50.0</u>

Table 41: Contribution of writing publications to each of the nine competency domains according to the collective data of all participants

16.1 Clinical teaching – the programme & the brochure

84.0% of participants stated that residents taught veterinary students during their programme and in the brochure, it was described as mandatory. (European College of Equine Internal Medicine, 2020).

Participants who answered that clinical teaching was applied in their programme, were then asked to estimate what percentage of time of the residency programme is spent on clinical teaching by the residents. The results are displayed in table 42 and figure 16.

16.1 Clinical teaching – the competency domains

The level to which clinical teaching was thought to contribute to the competency domains, is shown in table 43.

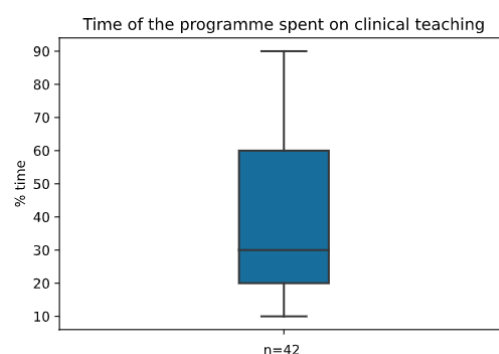


Figure 16: boxplot of the percentage of time of the entire programme which is spent on clinical teaching according to the collective data of participants who answered this question

	Mean	Median	SD	n =
All	39.5 %	30.0%	25.4%	42
Dipl.	31.3%	20.0%	25.0%	18
Res.	45.6%	40.0%	24.3%	24

Table 42: the percentage of time of the entire programme which is spent on clinical teaching, according to the data of all participants collectively, and of diplomats and residents separately

Domains – Clinical teaching (n=42)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	4.8	9.5	<u>40.5</u>	14.3	30.9
<i>Domain 2: Individual Animal Care</i>	4.8	16.7	<u>42.9</u>	9.5	26.2
<i>Domain 3: Animal Population Care</i>	4.8	33.3	<u>40.5</u>	9.5	11.9
<i>Domain 4: Public Health</i>	4.8	<u>40.5</u>	35.7	14.3	4.8
<i>Domain 5: Communication</i>	0.0	0.0	4.8	28.6	<u>66.7</u>
<i>Domain 6: Collaboration</i>	0.0	14.3	19.0	31.0	<u>35.7</u>
<i>Domain 7: Professionalism</i>	2.4	4.8	16.7	33.3	<u>42.9</u>
<i>Domain 8: Practice Management</i>	<u>38.1</u>	23.8	26.2	9.5	2.4
<i>Domain 9: Scholarship</i>	4.8	7.1	21.4	21.4	<u>45.2</u>

Table 43: Contribution of clinical teaching to each of the nine competency domains according to the collective data of all participants

17.1 Case-log – the programme & the brochure

All participants answered that residents must keep a case-log during their programme. According to the training brochure, a resident must keep a case log, which is essential to verify a residents’ progress. At the end of the residency, the case log should consist of at least 600 cases. Furthermore, all logged cases are obligated to have been seen in direct consultation with an ECEIM Diplomate or Diplomate from a different specialty. The 600 cases are divided between various disciplines, as seen in table 3 of page 26 of the brochure (European College of Equine Internal Medicine, 2020).

Participants were also asked which number of cases a resident is expected to have logged (on average) at the end of their residency. Results of this question are shown in figure 17 and table 44.

17.2 Case-log – the competency domains

The level to which maintaining a case-log was thought to contribute to the competency domains, is shown in table 45.

Table 44: the number of logged cases a resident is expected to have at the end of their residency, according to the data of all participants collectively, and of diplomats and residents separately

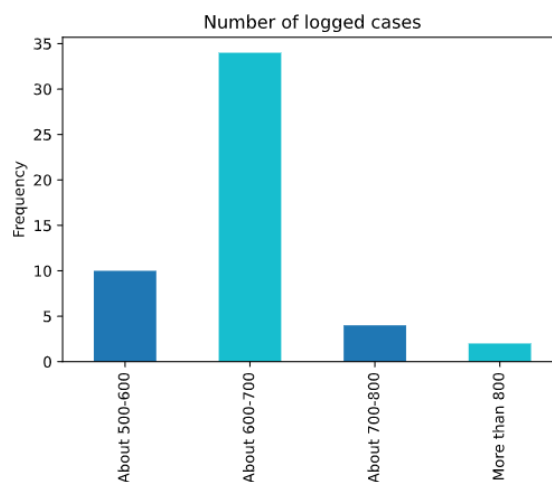


Figure 17: bar chart of the number of logged cases a resident is expected to have at the end of their residency, according to the collective data of all participants who answered this question (n=50)

Logged cases in total	% all (n=50)	% dipl. (n=21)	% res. (n=29)
Less than 500	0.0	0.0	0.0
About 500 to 600	20.0	28.6	13.8
About 600 to 700	68.0	47.6	82.8
About 700 to 800	8.0	14.3	3.4
More than 800	4.0	9.5	0.0

Domains – Case-log (n=50)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	<u>26.0</u>	14.0	16.0	24.0	20.0
<i>Domain 2: Individual Animal Care</i>	<u>30.0</u>	16.0	20.0	16.0	18.0
<i>Domain 3: Animal Population Care</i>	<u>32.0</u>	28.0	20.0	6.0	14.0
<i>Domain 4: Public Health</i>	<u>42.0</u>	28.0	20.0	0.0	10.0
<i>Domain 5: Communication</i>	<u>34.0</u>	24.0	18.8	14.0	10.0
<i>Domain 6: Collaboration</i>	<u>38.0</u>	24.0	14.0	12.0	12.0
<i>Domain 7: Professionalism</i>	<u>28.0</u>	20.0	22.0	14.0	16.0
<i>Domain 8: Practice Management</i>	<u>62.0</u>	26.0	6.0	0.0	6.0
<i>Domain 9: Scholarship</i>	<u>40.0</u>	12.0	20.0	16.0	12.0

Table 45: Contribution of keeping a case-log to each of the nine competency domains according to the collective data of all participants

18.1 Specialty specific education – the programme & the brochure

44.9% of participants answered that their residency training programme involved (non-patient based) specialty specific education. This includes lectures, seminars and practicing procedures organised specifically for residents. The training brochure does not specifically mention this type of education.

Those who received such tuition were then asked to estimate what percentage of time of the entire programme is spent on it. Results of this question are shown in figure 18 and table 46.

18.1 Specialty specific education – the competency domains

The level to which specialty specific education was thought to contribute to the competency domains, is shown in table 47.

Time of the programme spent on specialty specific education.

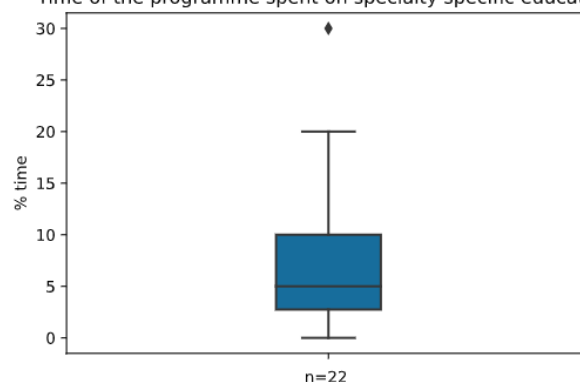


Figure 18: boxplot of the percentage of time of the entire programme which is spent on specialty specific education according to the collective data of participants who answered this question

	Mean	Median	SD	n =
All	8.7 %	5.0%	8.2%	22
Dipl.	9.8%	5.0%	9.0%	12
Res.	7.5%	5.0%	7.4%	10

Table 46: the percentage of time of the entire programme which is spent on specialty specific education according to the data of all participants collectively, and of diplomats and residents separately

Domains – Specialty specific education (n=22)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
<i>Domain 1: Clinical reasoning</i>	0.0	18.2	27.3	<u>36.4</u>	18.2
<i>Domain 2: Individual Animal Care</i>	0.0	13.6	27.3	<u>40.9</u>	18.2
<i>Domain 3: Animal Population Care</i>	9.1	<u>31.8</u>	22.7	<u>31.8</u>	4.5
<i>Domain 4: Public Health</i>	18.2	<u>36.4</u>	31.8	9.1	4.5
<i>Domain 5: Communication</i>	4.5	<u>27.3</u>	18.2	<u>27.3</u>	22.7
<i>Domain 6: Collaboration</i>	4.5	18.2	<u>31.8</u>	22.7	22.7
<i>Domain 7: Professionalism</i>	4.5	13.6	18.2	<u>45.5</u>	18.2
<i>Domain 8: Practice Management</i>	<u>54.5</u>	27.3	9.1	9.1	0.0
<i>Domain 9: Scholarship</i>	9.1	4.5	13.6	<u>36.4</u>	<u>36.4</u>

Table 47: Contribution of specialty specific education to each of the nine competency domains according to the collective data of all participants

19.1 Self-study – the programme & the brochure

69.4% of participants stated that their programme had assigned time for self-study. In the brochure, the ECEIM described that about 4 to 9 weeks per year are expected to be spent on preparation of scientific manuscripts and private study (European College of Equine Internal Medicine, 2020).

Participants who answered that their programme had assigned time for self-study, were then asked how many weeks per year are assigned to self-directed study. Results of this question are shown in figure 19 and table 48.

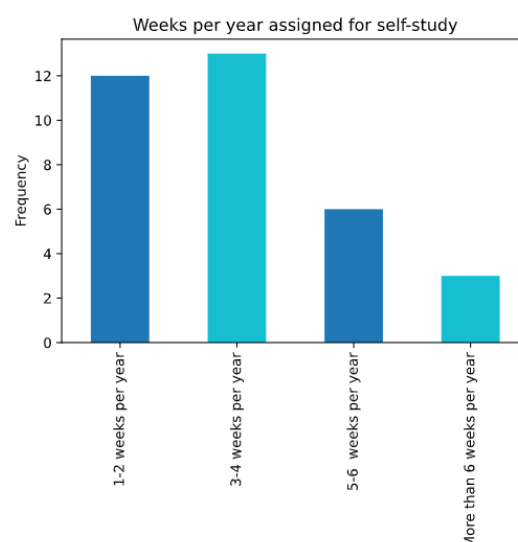


Figure 19: bar chart of the number of weeks per year that are assigned for self-directed study according to the collective data of all participants who answered this question (n=34)

19.2 Self-study – the competency domains

The level to which self-study was thought to contribute to the competency domains, is shown in table 49.

Weeks per year assigned to self-study	% all (n=34)	% dipl. (n=18)	% res. (n=16)
Less than 1 week	0.0	0.0	0.0
1-2 weeks	35.3	27.8	43.8
3-4 weeks	38.2	44.4	31.3
5-6 weeks	17.6	22.2	12.5
More than 6 weeks	8.8	5.6	12.5

Table 48: number of weeks per year that are assigned for self-directed study according to the data of all participants collectively, and of diplomats and residents separately

Domains – Self-study (n=34)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	2.9	5.9	29.4	<u>35.3</u>	26.5
<i>Domain 2: Individual Animal Care</i>	2.9	14.7	29.4	<u>32.4</u>	20.6
<i>Domain 3: Animal Population Care</i>	2.9	17.6	<u>32.4</u>	29.4	17.6
<i>Domain 4: Public Health</i>	2.9	20.6	<u>50.0</u>	14.7	11.8
<i>Domain 5: Communication</i>	32.4	<u>38.2</u>	14.7	8.8	5.9
<i>Domain 6: Collaboration</i>	32.4	<u>41.2</u>	14.7	5.9	5.9
<i>Domain 7: Professionalism</i>	5.9	20.6	<u>29.4</u>	32.4	11.8
<i>Domain 8: Practice Management</i>	<u>41.2</u>	32.4	20.6	0.0	5.9
<i>Domain 9: Scholarship</i>	2.9	2.9	29.4	29.4	<u>35.3</u>

Table 49: Contribution of self-directed study to each of the nine competency domains according to the collective data of all participants

20.1 Review performance – the programme & the brochure

57.1% of participants stated that residents and supervisors make appointments to thoroughly review the performance of the resident during the programme. The brochure described that the practical skills of the residents are evaluated on a daily basis. The assessment of general learning outcomes is said to be evaluated with the help of ‘workplace-based assessments’ (see 1.21). Also, the brochure described that the resident and diplomate must meet at least twice a year for the evaluation of performance and progress of the resident (European College of Equine Internal Medicine, 2020).

Participants who answered that residents and supervisors make these appointments, were then asked how often such appointments took place on an annual basis. Results of this question are shown in figure 20 and table 50.

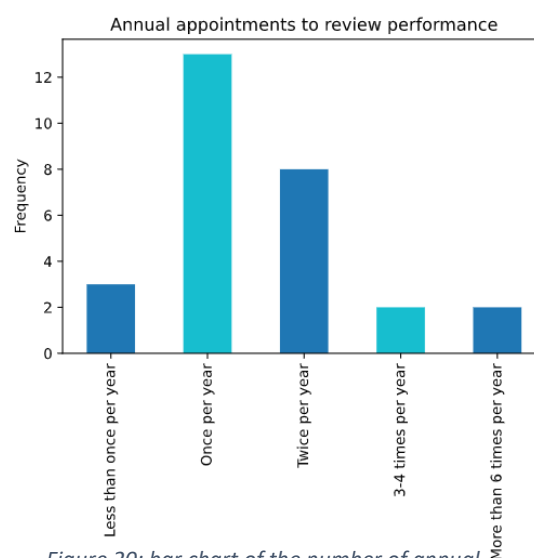


Figure 20: bar chart of the number of annual appointments to review the performance of the resident, according to the collective data of all participants who answered this question (n=28)

Appointments to review performance of resident per year	% all (n=28)	% dipl. (n=15)	% res. (n=13)
Less than once per year	10.7	6.7	15.4
Once per year	46.4	40.0	53.8
Twice per year	28.6	46.7	7.7
3-4 times per year	7.1	6.7	7.7
4-5 times per year	0.0	0.0	0.0
5-6 times per year	0.0	0.0	0.0
More than 6 times per year	7.1	0.0	15.4

Table 50: number of annual appointments to review the performance of the resident, according to the data of all participants collectively, and of diplomats and residents separately

20.2 Review performance – the competency domains

The level to which the review of the residents' performance was thought to contribute to the competency domains, is shown in table 51.

Domains – Review performance (n=28)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
<i>Domain 1: Clinical reasoning</i>	21.4	<u>32.1</u>	10.7	21.4	14.3
<i>Domain 2: Individual Animal Care</i>	<u>25.0</u>	<u>25.0</u>	14.3	17.9	17.9
<i>Domain 3: Animal Population Care</i>	<u>32.1</u>	21.4	28.6	3.6	14.3
<i>Domain 4: Public Health</i>	<u>32.1</u>	<u>32.1</u>	25.0	0.0	10.7
<i>Domain 5: Communication</i>	0.0	3.6	<u>35.7</u>	25.0	<u>35.7</u>
<i>Domain 6: Collaboration</i>	3.6	7.1	<u>35.7</u>	25.0	28.6
<i>Domain 7: Professionalism</i>	3.6	0.0	21.4	<u>42.9</u>	32.1
<i>Domain 8: Practice Management</i>	<u>42.9</u>	25.0	21.4	3.6	7.1
<i>Domain 9: Scholarship</i>	<u>32.1</u>	25.0	10.7	3.6	28.6

Table 51: Contribution of 'appointments to review the performance of the resident' to each of the nine competency domains, according to the collective data of all participants

21.1 Clinically Appraised Topics (CATs) – the programme & the brochure

One participant (n=49) acknowledged the use of CATs as an assessment tool in their programme, with a frequency of less than once a month. The ECEIM brochure does not mention the use of CATs.

22.1 Multi-source Feedback (MSF) – the programme & the brochure

24.5% of participants confirmed the use of MSF in their programmes. Though described in the brochure, use of MSF was not mandatory. It is but one of multiple WPBA's which may be helpful to the supervisor in assessing a residents' level of competency (European College of Equine Internal Medicine, 2020).

Participants who indicated that MSFs were applied in their programme, were asked what the monthly frequency of the use of MSFs was. The outcome of this question is shown in table 52.

Use of MSF per month	% all (n=12)	% dipl. (n=7)	% res. (n=5)
Less than once per month	83.3	71.4	100.0
Once per month	16.7	28.6	0.0
2-3 times per month	0.0	0.0	0.0
4-6 times per month	0.0	0.0	0.0
More than 4-6 times per month	0.0	0.0	0.0

Table 52: number of times MSF is applied on a monthly basis, according to the data of all participants collectively, and of diplomats and residents separately

22.2 Multi-source Feedback (MSF) – the competency domains

The level to which the use of MSF was thought to contribute to the competency domains, is shown in table 53.

Domains – MSF (n=12)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	16.7	25.0	<u>41.7</u>	8.3	8.3
<i>Domain 2: Individual Animal Care</i>	16.7	25.0	<u>41.7</u>	8.9	8.3
<i>Domain 3: Animal Population Care</i>	25.0	<u>33.3</u>	<u>33.3</u>	0.0	8.3
<i>Domain 4: Public Health</i>	33.3	<u>41.7</u>	16.7	0.0	8.3
<i>Domain 5: Communication</i>	8.3	16.7	0.0	<u>41.7</u>	33.3
<i>Domain 6: Collaboration</i>	8.3	<u>25.0</u>	8.3	<u>25.0</u>	33.3
<i>Domain 7: Professionalism</i>	8.3	16.7	8.3	<u>33.3</u>	<u>33.3</u>
<i>Domain 8: Practice Management</i>	<u>33.3</u>	25.0	16.7	16.7	8.3
<i>Domain 9: Scholarship</i>	<u>33.3</u>	25.0	16.7	16.7	8.3

Table 53: Contribution of MSF to each of the nine competency domains, according to the collective data of all participants

23.1 Direct Observation of Procedural Skills (DOPS) – the programme & the brochure

14.3% of participants recognised DOPS to be used as an assessment tool in their programme. Once again, the brochure mentioned this WBPA as non-mandatory, yet helpful in assessing a residents’ performance.

Participants who confirmed the use of DOPS in their programme were then asked about the monthly frequency of the use of DOPS. The result of this question is shown in table 54.

Use of DOPS per month	% all (n=7)	% dipl. (n=7)	% res. (n=0)
Less than once per month	14.3	14.3	NA
Once per month	0.0	0.0	NA
2-3 times per month	28.6	28.6	NA
4-6 times per month	0.0	0.0	NA
More than 4-6 times per month	57.1	57.1	NA

Table 54: number of times DOPS is applied on a monthly basis, according to the data of all participants collectively, and of diplomats and residents separately

23.2 Direct Observation of Procedural Skills (DOPS) – the competency domains

The level to which the use of DOPS was thought to contribute to the competency domains, is shown in table 55.

Domains – DOPS (n=7)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	28.6	14.3	0.0	14.3	<u>42.9</u>
<i>Domain 2: Individual Animal Care</i>	0.0	14.3	14.3	0.0	<u>71.4</u>
<i>Domain 3: Animal Population Care</i>	<u>42.9</u>	0.0	0.0	14.3	<u>42.9</u>
<i>Domain 4: Public Health</i>	<u>28.6</u>	<u>28.6</u>	0.0	14.3	<u>28.6</u>
<i>Domain 5: Communication</i>	14.3	0.0	<u>57.1</u>	14.3	14.3
<i>Domain 6: Collaboration</i>	<u>42.9</u>	0.0	14.3	28.6	14.3
<i>Domain 7: Professionalism</i>	0.0	28.6	14.3	14.3	<u>42.9</u>
<i>Domain 8: Practice Management</i>	<u>71.4</u>	14.3	0.0	14.3	0.0
<i>Domain 9: Scholarship</i>	<u>42.9</u>	14.3	14.3	14.3	14.3

Table 55: Contribution of DOPS to each of the nine competency domains, according to the collective data of all participants

24.1 Case based Discussion (CbD) – the programme & the brochure

61.2% of participants stated that CbD was used as an assessment tool in their programme. CbD use was not mentioned to be mandatory, however, useful in the assessment process (European College of Equine Internal Medicine, 2020).

Participants who confirmed the use of CbD as an assessment tool in their programme were asked about the frequency of its use, per month. The result of this question is shown in table 56.

Use of CbD per month	% all (n=30)	% dipl. (n=17)	% res. (n=13)
Less than once per month	13.3	5.9	23.1
Once per month	20.0	0.0	46.2
2-3 times per month	6.7	11.8	0.0
4-6 times per month	13.3	11.8	15.4
More than 4-6 times per month	46.7	70.6	15.4

Table 56: number of times CbD is applied on a monthly basis, according to the data of all participants collectively, and of diplomats and residents separately

24.2 Case based Discussion (CbD) – the competency domains

The level to which the use of CbD was thought to contribute to the competency domains, is shown in table 57.

Domains – CbD (n=30)	% ‘None at all’	% ‘A little’	% ‘A moderate amount’	% ‘A lot’	% ‘A great deal’
<i>Domain 1: Clinical reasoning</i>	0.0	6.7	6.7	20.0	<u>66.7</u>
<i>Domain 2: Individual Animal Care</i>	0.0	3.3	10.0	30.0	<u>56.7</u>
<i>Domain 3: Animal Population Care</i>	3.3	16.7	23.3	26.7	<u>30.0</u>
<i>Domain 4: Public Health</i>	16.7	20.0	<u>26.7</u>	23.3	13.3
<i>Domain 5: Communication</i>	0.0	3.3	16.7	26.7	<u>53.3</u>
<i>Domain 6: Collaboration</i>	3.3	6.7	16.7	<u>40.0</u>	33.3
<i>Domain 7: Professionalism</i>	0.0	6.7	16.7	26.7	<u>50.0</u>
<i>Domain 8: Practice Management</i>	<u>30.0</u>	13.3	23.3	<u>30.0</u>	3.3
<i>Domain 9: Scholarship</i>	6.7	10.0	16.7	<u>33.3</u>	<u>33.3</u>

Table 57: Contribution of CbD to each of the nine competency domains, according to the collective data of all participants

25.1 Client Survey (CS) – the programme & the brochure

This tool was said to be applied in the programmes of 6.1% of participants. Like the other WBPA, use of CS was not described to be mandatory (European College of Equine Internal Medicine, 2020).

There were three participants who confirmed the use of CS as an assessment tool in their programme. Two of them stated that CS was implied less than once per month and one stated that it was used 4-6 times per month.

25.2 Client Survey (CS) – the competency domains

The results regarding the contribution of CS to the development of the competency domains is not shown due to the low number of respondents to the regarding question.

26.1 Mini-Clinical Evaluation Exercise (mini-CEX) – the programme & the brochure

14.3% of participants answered that mini-CEX is used as an assessment tool in their programme. Use of the mini-CEX was not obligatory, however, helpful in assessing the skills mentioned before.

Participants who confirmed the use of mini-CEX as an assessment tool in their programmes, were asked about the monthly frequency of the use of mini-CEX. The outcome of this question is shown in table 58.

Use of mini-CEX per month	% all (n=7)	% dipl. (n=7)	% res. (n=0)
Less than once per month	0.0	0.0	NA
Once per month	14.3	14.3	NA
2-3 times per month	42.9	42.9	NA
4-6 times per month	0.0	0.0	NA
More than 4-6 times per month	42.9	42.9	NA

Table 58: number of times mini-CEX is applied on a monthly basis, according to the data of all participants collectively, and of diplomats and residents separately

26.2 Mini-Clinical Evaluation Exercise (mini-CEX) – the competency domains

The participants who confirmed the use of mini-CEX in their programmes, were then asked how much they thought this WPBA contributed to the development of the 9 competency domains as described in the CBVE framework (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018). The results of this question are shown in table 59.

Domains – mini-CEX (n=7)	% 'None at all'	% 'A little'	% 'A moderate amount'	% 'A lot'	% 'A great deal'
<i>Domain 1: Clinical reasoning</i>	0.0	0.0	28.6	14.3	<u>57.1</u>
<i>Domain 2: Individual Animal Care</i>	0.0	0.0	28.6	14.3	<u>57.1</u>
<i>Domain 3: Animal Population Care</i>	0.0	14.3	<u>57.1</u>	0.0	28.6
<i>Domain 4: Public Health</i>	14.3	<u>42.9</u>	28.6	0.0	14.3
<i>Domain 5: Communication</i>	0.0	0.0	28.6	13.4	<u>57.1</u>
<i>Domain 6: Collaboration</i>	0.0	28.6	<u>42.9</u>	0.0	28.6
<i>Domain 7: Professionalism</i>	0.0	0.0	28.6	28.6	<u>42.9</u>
<i>Domain 8: Practice Management</i>	28.6	<u>57.1</u>	0.0	14.3	0.0
<i>Domain 9: Scholarship</i>	14.3	<u>28.6</u>	14.3	<u>28.6</u>	14.3

Table 59: Contribution of mini-CEX to each of the nine competency domains, according to the collective data of all participants

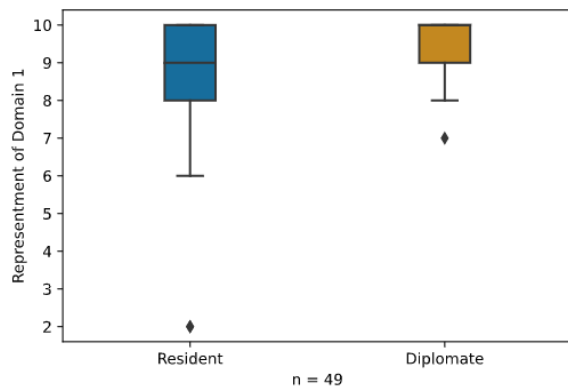
Other tools

At the end of the survey, participants were asked to mention any training tools that were applied in their programme, but not mentioned in the questionnaire. Two participants mentioned exam training, and one mentioned a course on feedback guidance.

3) The overall representation of the development of the different competency domains in the training programme of the ECEIM

In last part of the questionnaire, respondents were asked to rate how the development of the nine competency domains as described in the CBVE (AAVMC Working Group on Competency-Based Veterinary Education et al., 2018) are represented in their own residency programmes. The rating scale was from 1 (not represented at all) to 10 (very well represented). The results of this question are visualised in this paragraph, for all nine competency domains.

Domain 1: Clinical reasoning and decision making

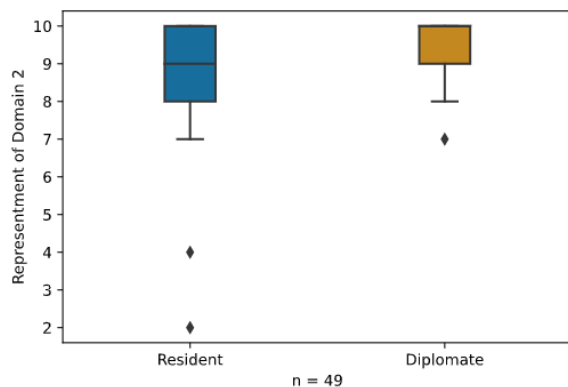


	Mean	Median	SD	n=
All	8.8	9.0	1.8	49
Dipl.	9.3	10.0	0.9	20
Res.	8.4	9.0	2.1	29

Table 60: Representation of domain 1 in the residency programmes, according to the data of all participants collectively, and of diplomats and residents separately (1 = not represented at all, 10 = very well represented)

Figure 21: boxplot of the representation of domain 1 in the residency programmes according to the data of residents (blue) and diplomats (orange), separately (1 = not represented at all, 10 = very well represented)

Domain 2: Individual Animal Care and Management

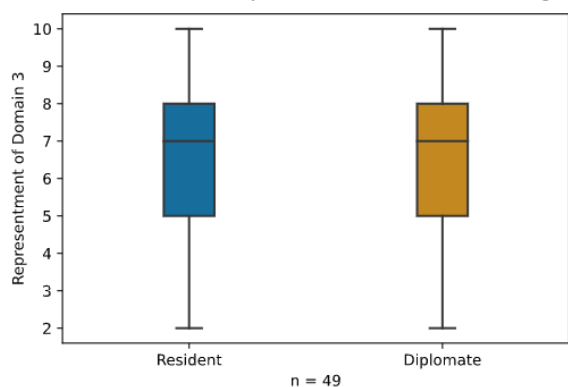


	Mean	Median	SD	n=
All	8.9	10.0	1.6	49
Dipl.	9.3	10.0	0.9	20
Res.	8.7	9.0	1.9	29

Table 61: Representation of domain 2 in the residency programmes, according to the data of all participants collectively, and of diplomats and residents separately (1 = not represented at all, 10 = very well represented)

Figure 22: boxplot of the representation of domain 2 in the residency programmes according to the data of residents (blue) and diplomats (orange), separately (1 = not represented at all, 10 = very well represented)

Domain 3: Animal Population Care and Management

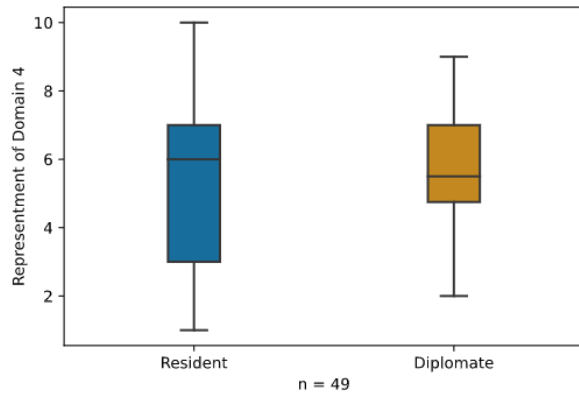


	Mean	Median	SD	n=
All	6.8	7.0	2.2	49
Dipl.	6.7	7.0	2.2	20
Res.	6.8	7.0	2.3	29

Table 62: Representation of domain 3 in the residency programmes, according to the data of all participants collectively, and of diplomats and residents separately (1 = not represented at all, 10 = very well represented)

Figure 23: boxplot of the representation of domain 3 in the residency programmes according to the data of residents (blue) and diplomats (orange), separately (1 = not represented at all, 10 = very well represented)

Domain 4: Public Health

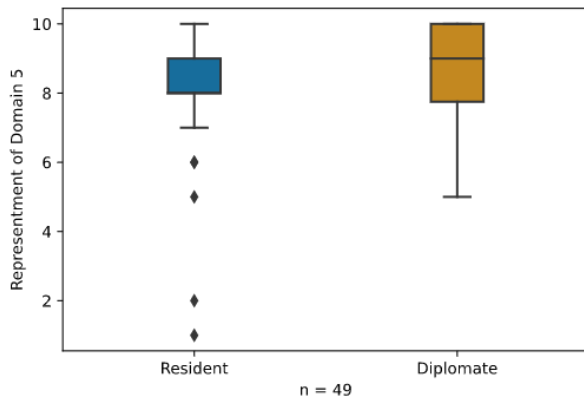


	Mean	Median	SD	n=
All	5.4	6.0	2.3	49
Dipl.	5.6	5.5	2.0	20
Res.	5.3	6.0	2.6	29

Table 63: Representation of domain 4 in the residency programmes, according to the data of all participants collectively, and of diplomats and residents separately (1 = not represented at all, 10 = very well represented)

Figure 24: boxplot of the representation of domain 4 in the residency programmes according to the data of residents (blue) and diplomats (orange), separately (1 = not represented at all, 10 = very well represented)

Domain 5: Communication

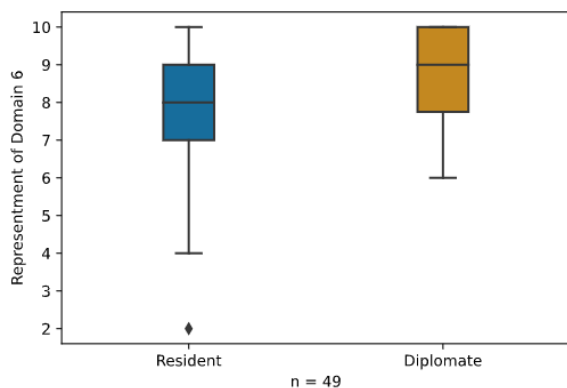


	Mean	Median	SD	n=
All	8.2	8.0	1.9	49
Dipl.	8.6	9.0	1.5	20
Res.	7.9	8.0	2.2	29

Table 64: Representation of domain 5 in the residency programmes, according to the data of all participants collectively, and of diplomats and residents separately (1 = not represented at all, 10 = very well represented)

Figure 25: boxplot of the representation of domain 5 in the residency programmes according to the data of residents (blue) and diplomats (orange), separately (1 = not represented at all, 10 = very well represented)

Domain 6: Collaboration

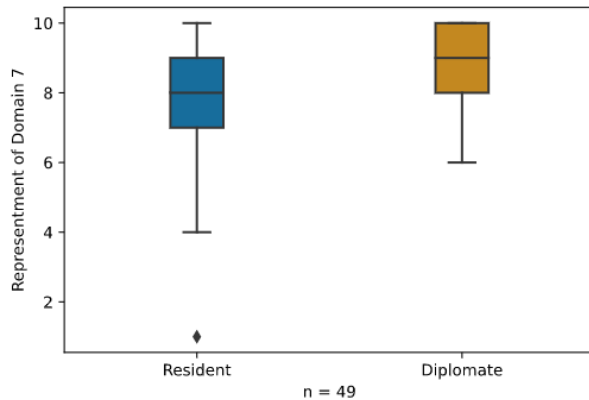


	Mean	Median	SD	n=
All	8.1	8.0	1.7	49
Dipl.	8.6	9.0	1.3	20
Res.	7.8	8.0	2.0	29

Table 65: Representation of domain 6 in the residency programmes, according to the data of all participants collectively, and of diplomats and residents separately (1 = not represented at all, 10 = very well represented)

Figure 26: boxplot of the representation of domain 6 in the residency programmes according to the data of residents (blue) and diplomats (orange), separately (1 = not represented at all, 10 = very well represented)

Domain 7: Professionalism and Professional Identity

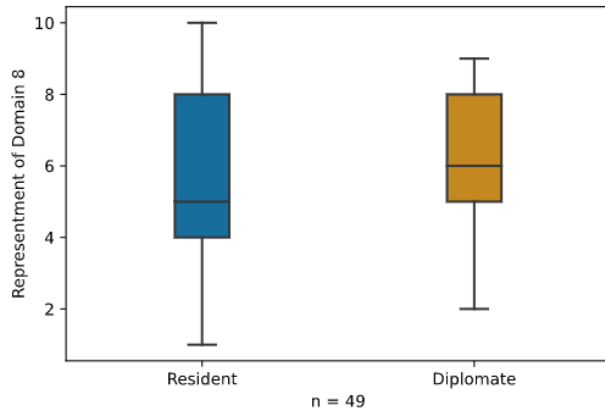


	Mean	Median	SD	n=
All	8.1	8.0	1.9	49
Dipl.	8.7	9.0	1.3	20
Res.	7.7	8.0	2.1	29

Table 66: Representation of domain 7 in the residency programmes, according to the data of all participants collectively, and of diplomats and residents separately (1 = not represented at all, 10 = very well represented)

Figure 27: boxplot of the representation of domain 7 in the residency programmes according to the data of residents (blue) and diplomats (orange), separately (1 = not represented at all, 10 = very well represented)

Domain 8: Financial and Practice Management

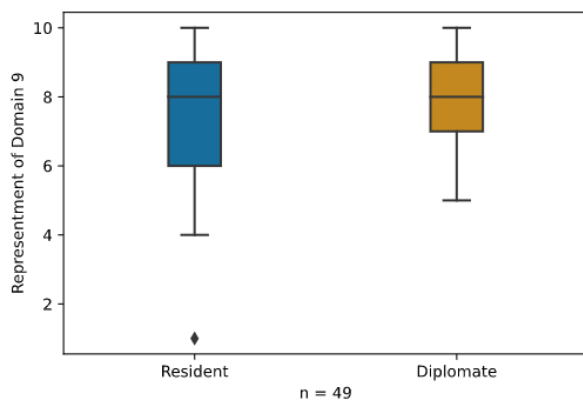


	Mean	Median	SD	n=
All	5.9	6.0	2.4	49
Dipl.	6.0	6.0	2.2	20
Res.	5.8	5.0	2.5	29

Table 67: Representation of domain 8 in the residency programmes, according to the data of all participants collectively, and of diplomats and residents separately (1 = not represented at all, 10 = very well represented)

Figure 28: boxplot of the representation of domain 8 in the residency programmes according to the data of residents (blue) and diplomats (orange), separately (1 = not represented at all, 10 = very well represented)

Domain 9: Scholarship



	Mean	Median	SD	n=
All	7.6	8.0	2.0	49
Dipl.	8.0	8.0	1.5	20
Res.	7.3	8.0	2.3	29

Table 68: Representation of domain in the residency programmes, according to the data of all participants collectively, and of diplomats and residents separately (1 = not represented at all, 10 = very well represented)

Figure 29: boxplot of the representation of domain 9 in the residency programmes according to the data of residents (blue) and diplomats (orange), separately (1 = not represented at all, 10 = very well represented)

Discussion

Document analysis

The goal of the document analysis was to find out which training tools were used within the different training programmes of veterinary specialists. First, it is important to mention that the nature of the different specialisations varies a lot. For this reason, the use of certain training tools (or their application) in residency programmes may vary as well. The lack of use of certain training tools does not necessarily imply that one college is better than the other. Comparing the quality of residency programmes of the various colleges was not the goal of this study and its results are not suitable for this goal.

It was no surprise that hands-on clinical training was applied in all colleges, since this is an essential part of the job as a veterinarian. There was some variation in the amount of time spent on hands-on clinical training (see table 1). Based on the data of this table, the average amount of time spent on clinical training would be 61.5%. Not all colleges required hands-on experience with (living) animals, due to the nature of the college. In this case, especially the ECVCN and the ECPVS stood out for spending less (minimal amount of) time on hands-on clinical training. Based on the information from the brochure, the ECVCN seems primarily research oriented by nature and so, spending less time on clinical training can be expected. It was unclear from the brochure if the same applied to the ECPVS.

Diplomate supervision was part of the programmes of all colleges. A positive result, since effective supervision is known to be of great importance to the professional development of the resident and it is essential to create a safe learning environment. (Busari, Weggelaar, Knottnerus, Greidanus, & Scherpbier, 2005). The results of the pilot study showed a corresponding result, namely that diplomate supervision was thought to contribute a lot to the development of various competency domains of the resident (see table 13). Many colleges did not mention the amount of time that should be spent under direct diplomate supervision, however.

Furthermore, only the ECEIM and ECVD mentioned the use of the different WPBA's. The reason why these assessment methods are not mentioned in other brochures is unknown. This is unfortunate since WPBAs can have a positive effect on practice (Saedon, Salleh, Balakrishnan, Imray, & Saedon, 2012).

Also, publication of research papers were said to be part of the programmes of all colleges. A contradicting and thus, interesting finding was that even though all residency programmes required the resident to publish papers, not all programmes described that the resident had to do a research project or described a set amount of time that the resident should spend on research. This could be improved to better reflect the actual situation in the training institutes and to make sure residents are assigned specific time to spend on doing research and writing papers for publication.

Something else worth mentioning is that there were some helpful tools which seemed to be universally applicable, but which were not applied in all programmes. Examples are found in journal clubs and externships. Journal clubs are helpful since they can improve the residents' scientific reading skills, knowledge of biostatistics and the use of literature in practice (Ebbert, Montori, & Schultz, 2001). Externships may help to improve knowledge and self-confidence of the resident. This effect has already been found in veterinary students (Hedge, Hedge, Bossong, Gordon-Ross, & Kovacs, 2019). These and other tools mentioned in the document analysis could be more or less helpful for a specific programme. Still, each residency programme is unique, and we do not want to imply that these and other tools should definitely be applied in all colleges. However, it may be helpful for each college to reconsider the value and use of the tools which they currently do not apply.

Strengths & limitations

Most EBVS colleges had a clear and separate section or document for their training brochures. However, comparing these documents was a challenge since the training brochures varied by quite some extent in their level of detail. Furthermore, it was sometimes difficult to find them, because they were seemingly hidden in large 'bylaws' and 'policies and procedures' documents of a college or because they had no open access.

Another issue of the document analysis was that it was sometimes unclear if training tools were recommended or mandatory. This made it difficult to put the results of all colleges together. For the sake of simplicity, tools were considered to be applied when they were mentioned to be mandatory or recommended.

One of the strengths of the document analysis is its efficiency and cost-effectiveness, since no data had to be manually collected to conduct this analysis (Bowen, 2009). Furthermore, documents are stable and exact sources of information. The document analysis was especially helpful prior to the pilot-study since it was an effective method to find the tools which the (different) colleges use. Applying this method gave us the ability to develop a specific questionnaire with mostly close-ended questions, which made the questionnaire easier to complete (Hyman & Sierra, 2016).

However, there are limitations to the method. For example, if some documents are unavailable or if these differ in detail, as was also the case in this study. Furthermore, not all documents used in the analysis are retrievable, or may not be retrievable in the future. For example, at this moment the website of the ECVPS is unavailable which makes their training brochures inaccessible as well.

With this research method, a systematic approach is necessary. Therefore, specific criteria to mark a tool as 'applied' were used and these criteria were mentioned for each tool, individually, in the results. It is also important to realise that the documents are not necessarily an accurate and precise representation of the actual training programmes. By combining the document analysis with a pilot-study, an attempt was made to create a more valid and credible result (Bowen, 2009).

Recommendations

As mentioned before, many colleges did not describe the amount of time that should be spent under direct diplomate supervision. It is advisable for those colleges to specify this amount, considering the importance of the tool for the residents' development (Busari et al., 2005).

Since the use of WPBA's can have a positive effect on practice (Saedon et al., 2012) all colleges should consider using these tools in their programmes.

Some of the training brochures were difficult to find. It is easy to imagine that this can be very confusing for future residents who are interested in the details of a programme. Furthermore, some documents especially described *what* they expected a resident to achieve during the programme, but not *how*. Considering these issues, it could be helpful for future residents if the colleges of the EBVS have a standard format for their training brochures. Moreover, this should be a document which is easy to find, and which has open access. Our suggestion is to publish a list of these documents on the EBVS website.

Finally, it could be helpful for all colleges to reconsider the value, relevancy and use of the tools which they currently do not apply. Especially if these tools are known to be beneficial for a residents' development.

Pilot-study

The goals of the pilot study were 1) to find out if and how the training tools, as mentioned in the training brochures, were applied within the actual programme 2) to find out if these training tools contributed to the personal development of competencies of residents and 3) to find out if there was a difference in perception between diplomats and residents on how the competency-based education is represented in the programme.

First goal: the programme & the brochure

For the most part, the brochure and the answers given by participants of the questionnaire seemed to correspond with each other. There were, however, some interesting and surprising results. Due to the number of results in this study, only those that stood out are discussed in this section.

One of these results was that the number of cases that residents work up exceeds the minimum given in the brochure by quite some extent. According to the participants, 11.7 cases are worked-up by a resident on a weekly basis. If only the 93 weeks spent on 'hands on clinical training' are considered, the case load would be 1088 (European College of Equine Internal Medicine, 2020). That would be almost twice as many as the required minimum of 600 logged cases. The average number of 11.7 is, however, an estimate and the actual weekly caseload may differ from this number. Besides, not all cases seen by the resident have to be logged. Furthermore, participants stated that on average, 73.2% of their programme is under direct supervision of a diplomate. This would mean that 762 of these given 1088 cases are seen in direct consultation with a diplomate. At least all logged cases must have been seen in direct consultation with a diplomate, according to the brochure. This would mean that the amount of diplomate supervision is sufficient. Nevertheless, the standard deviation on the percentage of 73.2% was relatively high.

The minimum amount that should be spent on training rotations was not always reached, however. According to our data, 39.3% percent of participants answered that over 12 weeks of the entire programme were spent on training rotations. The remaining 60.7% of participants stated that 12 weeks or less was spent on it. This would mean that a large part of participants' programmes did not correspond with the required 12 weeks as stated in the brochure.

Another interesting finding was that, on average, participants stated to spend more time on research than the 7.6% or 12 weeks of the programme stated in the brochure. Participants who answered that there was time reserved for research (98.2%) estimated that on average, about 17.6% of total duration of the programme was spent on research. That is more than twice as much as stated in the brochure. Spending more time on research than the given 12 weeks does not negatively impact the residency programme or a residents' career. Rather, the opposite is true. Residents who publish during their residency are more likely to continue doing so in their further career (Macknin, Brown, & Marcus, 2014). Questionable, however, is that the extra time spent on research probably means that less is spent on other forms of professional development which may be of equal importance.

Furthermore, a lot of the tools that were merely described as recommended in the brochure were actually applied in quite a few programmes. Examples of this can be found in part 8.1 (case presentations), 9.1 (journal clubs) and 10.1 (book clubs) of the results. Externships were also applied in 57.7% of cases and were not even mentioned in the brochure of the ECEIM. On the contrary, there were tools that were mandatory according to the brochure which were not applied in a many programmes. Examples of this are found in 13.1 (workshops & seminars), 16.1 (clinical teaching), 19.1 (self-study) and 20.1 (review of the performance) of the results.

Especially this result for the review of a residents' performance was considered rather interesting. Even though residents and diplomats were meant to meet twice a year for a thorough assessment of the residents' performance, 42.9% of participants stated that this did not happen at all. A large portion of those who answered that it was applied, still indicated that it did not happen twice a year. Why this result came up is unclear. Not only considering the fact that this tool was mandatory, but also because this feedback moment can be very valuable for the residents' development. This is the case for either for negative or positive feedback (Bazrafkan, Ghassemi Gholam Hossain, & Nabeiei, 2013).

With the exception of Case-based discussions, WPBAs were not used according to most participants. The reason for this is unclear. It may be worth finding out why the use of WPBAs was so limited, because WPBAs can have a positive effect on practice and can have a positive educational impact (Brinkman et al., 2007; Miller & Archer, 2010; Saedon et al., 2012).

Looking at table 5, it becomes clear that for most tools, residents and diplomats relatively agreed on tools being applied or not. However, for some tools, interesting differences can be observed between the percentage of residents (R), and the percentage of diplomats (D) when they were asked if the tools were applied or not. Discrepancies were found for books clubs (D: 69,6% and R: 46.7%), specialty specific education (D: 60.0% and R: 34.5%), self-study (D: 90.0% and R: 55.2%), review of performance (D: 75.0% and R: 44.8%), MSF (D: 35.0% and R: 17.2%), DOPS (D: 35.0% and R: 0.0%), CBD (D: 85.0% and R: 44.8%), and mini-CEX (D: 35.0% and R: 0.0%). An explanation for this difference may be that the appliance of the tool is either underrated by residents or overrated by diplomats. Another explanation is that the application of these tools differs between the various home institutions of the participants. The residents and diplomats were, after all, not evenly distributed among institutions. In any case, it would be interesting to find the reason for this observed difference in perception between residents and diplomats.

Diplomats gave a higher estimate of the number of times in which journal clubs and CbD were applied, compared to residents. Furthermore, diplomats suggested they gave more supervision than residents seemed to receive. Also, residents estimated a higher number of weeks that were spent on internships and externships. Again, the reasons for these discrepancies are unknown.

Second goal: the competency domains

Looking at the overall results of the pilot study, it seems clear that the tools that were described in this study mainly contributed to domain 1 and 2. This is not really a surprise, considering the nature of the ECEIM. Equine Internal Medicine is a very hands-on clinical specialty which mainly focuses on the individual animal. A lot of the tools which were discussed in this study also focused on clinical aspects at the level of an individual animal.

For this same reason, the tools contributed less to the development of domains 3 and 4. However, it seemed not necessarily underrepresented. Often, participants still stated that the tools contributed either a little, a moderate amount or a lot to these domains.

The tools did not score very high on contribution to domain 8, however. For almost all tools, the majority of participants stated that the tool only contributed a little, or none at all to domain 8. This domain may seem less important than for example, domain 1 and 2. This domain is more often ranked as less important in surveys of stakeholders in veterinary medicine (Bell, Cake, & Mansfield, 2018). On the contrary, practice management is regarded as one of the most important skills for a successful career in veterinary practice and many veterinary graduates feel like more skills in this field would have made the transition from education to the workplace easier (Bell et al., 2018). For this reason, it may be worth finding out if and how the development of domain 8 deserves more attention in postgraduate veterinary education. The other domains were represented in a manner which was seemingly in accordance with the training tool considered.

Keeping a case-log did not contribute to any of the competency domains according to residents and diplomats. As a mandatory part of the programme, one might expect that this is important for a resident's development and that it helps residents to reflect on their patients. However, it may have been regarded as a bureaucratic issue needed to finish the programme. It would be interesting to find out why the participants gave such a low rating to a mandatory tool of the programme.

WPBAs are rarely used in ECEIM residency training programmes, according to the questionnaire. Therefore, the number of participants who answered questions regarding the contribution of WPBAs to the different competencies was very low. This data is, therefore, less robust and should be interpreted with caution.

Data regarding the contribution to the competency domains for each tool was not split between residents and diplomats in the tables. Therefore, possible discrepancies between the two groups are not visible.

Third goal: the competency domains, according to diplomats and residents

The development of domains 1 and 2 are rated the highest in being represented in the study. Domains 3, 4 and 8 are rated the lowest, with the development of domain 4 being the least represented in the study, rated a 5.4 on average. Equine internal medicine is a specialty which primarily focuses on the individual patient rather than herd health and zoonotic disease, therefore, this result is not very surprising. Domains 5, 6, 7 and 9 were all said to be pretty well represented on average. Domain 9 was granted a 7.6 on the scale of 1 to 10, and the ratings of the other three are above an 8.0. Based on these results, it could be concluded that the competency domains are acceptably well represented. This, with the sidenote that the (under)representation and estimated importance of domain 8 is something worth reconsidering.

Another result worth mentioning is that, with the exception of domain 3, residents give a lower rating for each of the competency domains than diplomats do. On average, residents' rating was 0.6 lower than the rating of diplomats (on a scale from 1 to 10). It can be concluded that, in general, residents feel like the development of the competency domains are not represented as well as diplomats do. The reason for this is unclear. Despite this average lower rating from the residents, it could be said that diplomats and residents show similar results when asked about the overall representation of the various competency domains.

The participants of the study were not asked if they felt like the representation of the domains was sufficient. This may be something worth asking in a possible follow-up study.

Strengths & limitations

For the pilot-study, a questionnaire was used to obtain data from its participants. Questionnaires make it possible to obtain data from participants in many different locations, as is the case in this study. It was thought to be suitable for this study since participants can be asked about their opinion and attitude, towards and about various subjects (Rowley, 2014).

However, questionnaires come with their own limitations and possible biases. This was kept in mind during the development of the questionnaire. For that reason, confusing terms or jargon were clarified. Rating scales were applied when asked about the frequency of a tool (instead of simply asking for 'frequent' or 'often' use). These rating scales had no missing or overlapping intervals and for the questions that asked if a training tool is applied in one's programme, there was always a category 'Don't know' which respondents could choose from. Furthermore, use of wordings was kept similar

throughout the questionnaire. In this way, an attempt was made to minimise response biases (Boynton & Greenhalgh, 2004; Choi & Pak, 2005).

Nevertheless, the questionnaire was long. This possibly negatively influenced the response rate (Edwards, Roberts, Sandercock, & Frost, 2004; Sahlqvist et al., 2011; Smith, Olah, Hansen, & Cumbo, 2003). Moreover, it may have resulted in response fatigue and, therefore, inaccurate answers. Participants were also asked to rate amounts of time and state how often a training tool is applied. It is possible that respondents recalled these numbers incorrectly or that the answers were influenced by the mindset of the participant at that moment (Choi & Pak, 2005).

The survey was almost entirely made up of close-ended questions. This decision was made to make analysing the data easier and to maximise the response rate. (Boynton & Greenhalgh, 2004; Choi & Pak, 2005). However, this choice may result in missing variables. Furthermore, when asking the respondents to rate the development and representation to competency domains, respectively, we may have left potential responses out. (Nahmias-Wolinsky, 2004). In our case, there may have been certain competencies that were not described in the CBVE model, but that were represented in the programme. Furthermore, there may have been training tools which were used in the programme without being mentioned in the brochures. These were not included in the questionnaire. However, participants were asked in an open-ended question to mention if there were tools used in their programme which were not mentioned in the questionnaire. There was very little response to this question, which suggest that the tools were well represented in the questionnaire.

No random sample was taken, every resident and diplomate of the ECEIM who wanted to participate in this pilot-study was allowed to do so. Therefore, it may be that participants who already had a strong opinion on the representation of the development of competency domains in their residency programme influenced the results of the study. This makes it possible that some degree of selection bias has crept in.

Further research and recommendations

The overall results of the pilot-study suggest that the actual training programme does correspond relatively well with the ECEIM training brochure. Nonetheless, we found that not all tools seemed to be applied as often as they were described to be in the brochure. Especially the review of a residents' performance, workshops and seminars, clinical teaching and self-study were tools that were underrepresented in the actual programmes compared to the brochure. It may be worth finding out why these tools were not applied as often as they were supposed to be. Furthermore, WPBA's were found to be rarely applied, despite their proven utility.

Participants of this study were often asked about the number of times a training tool was applied, and whether they thought it contributed to the competency domains. However, we failed to ask the participants if they felt that the amount of time spent on a tool, or the amount that tool contributes to the development of the different competency domains was sufficient. This may be more significant information than the number itself since it would give more information on the effectiveness of the tool, and whether its use is in line with the personal needs of the residents.

The results of this study suggest that a follow-up study of the pilot-study, with some adaptations, is feasible. If the study is to be carried out for the other colleges of the EBVS, it is recommendable that participants are also asked whether they feel like the amount that training tools are used is sufficient or not. Also, if their contributions to the competency domains is sufficient. This may help colleges to find out how valuable the training tools they use are for the development of the overall competency of the resident. However, the questionnaire used in this study was already quite long. Extending the

length of the questionnaire may further negatively affect the response rate and the accuracy of the answers given. It may be an option to first determine the contribution of tools to the different competency domains in general, separately. This may lead to loss of more specific information on the topic. Nonetheless, by doing so, the length of the questionnaire will not increase despite the suggested additional questions. Therefore, response rates will not decrease.

Conclusions

The document analysis resulted in an overview of the various training tools that were used in the different residency programmes of the EBVS. We found that all colleges implied hands-on clinical training and direct diplomate supervision. Furthermore, we found that WPBA's were barely applied and that some of the training brochures were very hard to find and interpret. A standard format of the training brochure for the various colleges of the EBVS is, therefore, suggested. We also suggest that these documents should be open access and that they should be easy to find (for example; on the EBVS website).

The results of the pilot-study showed that the training brochure of the ECEIM was often in line with the actual programme in its practical setting. However, some mandatory tools were not applied as often as they were supposed to. This was the case for the review of a residents' performance, workshops and seminars, clinical teaching, and self-study.

Furthermore, the development to competency domains regarding animal population care and management, public health, and financial and practice management were less represented in the residency programme than competency domains regarding individual animal care and management, clinical reasoning and decision making, communication, collaboration, professionalism and professional identity and scholarship. This is unsurprising, considering the primary focus of the ECEIM on the individual animal. However, the importance of financial and practice management should be reconsidered.

The pilot-study lacks data on how residents and diplomats felt about the current use of the training tools and whether the number of times it was applied was sufficient or not. We suggest that a possible follow-up study amongst the other colleges of the EBVS should also focus on the latter. This information, in combination with the findings of this study, might help in establishing guidelines for more efficient and effective competency-based training for veterinary specialists in and outside of Europe.

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Appendix 1: The results of the document analysis

Table A.1: Results of the ECAR, ECAAH, ECBHM, ECEIM, ECPVS and the ECSMHM

Training tools	ECAR	ECAAH	ECBHM	ECEIM	ECPVS	ECSMHM
1. Hands-on clinical training	X	X	X	X	X	X
2. Involvement in the direct work-up of patients (diagnosis and treatment)	X		X	X		X
3. Performing therapeutic and diagnostic procedures	X	X	X	X	X	X
4. Resident has primary responsibility in majority of cases				X		
5. Direct diplomate supervision	X	X	X	X	X	X
6. Receiving clinical appointments	X	X	X	X		X
7. Supervising daily management of hospitalised or laboratory animals		X		X		
8. Training rotations in related disciplines and training units			X	X		
9. Participating in an externship	X		X			
10. Performing an extensive amount of laboratory work		X			X	X
11. Engagement in case presentations			X	X	X	X
12. Engagement in journal/book clubs (scientific meetings)	X		X	X	X	X
13. Conference attendance	X	X	X	X	X	X
14. Attendance of (in-house) resident workshops/seminars	X		X	X	X	X
15. First publication	X	X	X	X	X	X
16. Second publication	X	X	X	X	X	X
17. Participation in clinical teaching	X	X	X	X	X	X
18. Giving presentations on conferences	X		X	X	X	X
19. Do a research project	X	X	X	X	X	X
20. Write a case report	X	X	X	X	X	X
21. Maintaining a case-log	X	X	X	X	X	
22. Maintaining a diary/log of activities (such as clinical service, externship etc.)	X	X	X	X	X	X
23. Clinically Appraised Topics (CAT)						
24. Multi-source feedback (MSF)				X		
25. Direct Observation of Procedural Skills (DOPS)				X		
26. Case-based discussion (CbD) with colleagues and supervisors				X		
27. Client survey (PS)				X		
28. Mini-Clinical Evaluation Exercises (mini-CEX)				X		
29. Review performance of resident through discussion with supervisor	X	X	X	X		X
30. Receiving specialty specific tuition	X					
31. Practice self-directed study	X	X		X		

Table A.2: Results of the ECVA, ECVN, ECVCP, ECVD, ECVDI and the ECVECC

Training tools	ECVAA	ECVCN	ECVCP	ECVD	ECVDI	ECVECC
1. Hands-on clinical training	x	x	x	x	x	x
2. Involvement in the direct work-up of patients (diagnosis and treatment)		x		x		x
3. Performing therapeutic and diagnostic procedures	x		x	x	x	x
4. Resident has primary responsibility in majority of cases				x		x
5. Direct diplomate supervision	x	x	x	x	x	x
6. Receiving clinical appointments	x	x		x	x	x
7. Supervising daily management of hospitalised or laboratory animals						
8. Training rotations in related disciplines and training units	x		x		x	x
9. Participating in an externship	x	x	x			
10. Performing an extensive amount of laboratory work		x	x			
11. Engagement in case presentations		x			x	x
12. Engagement in journal/book clubs (scientific meetings)	x			x	x	x
13. Conference attendance	x	x	x	x	x	x
14. Attendance of (in-house) resident workshops/seminars	x	x	x	x		x
15. First publication	x	x	x	x	x	x
16. Second publication	x	x	x	x	x	x
17. Participation in clinical teaching	x	x		x	x	x
18. Giving presentations on conferences		x	x	x	x	
19. Do a research project	x	x		x		x
20. Write a case report	x	x		x		x
21. Maintaining a case-log	x	x	x	x	x	
22. Maintaining a diary/log of activities (such as clinical service, externship etc.)	x	x	x	x	x	
23. Clinically Appraised Topics (CAT)				x		
24. Multi-source feedback (MSF)						
25. Direct Observation of Procedural Skills (DOPS)				x		
26. Case-based discussion (CbD) with colleagues and supervisors				x		
27. Client survey (PS)						
28. Mini-Clinical Evaluation Exercises (mini-CEX)				x		
29. Review performance of resident through discussion with supervisor	x	x		x	x	
30. Receiving specialty specific tuition					x	x
31. Practice self-directed study		x		x	x	x

Table A.3: Results of the ECVIM, ECVN, ECVO, ECVP, ECVPT and the ECVSMR

Training tools	ECVIM	ECVN	ECVO	ECVP	ECVPT	ECVSMR
1. Hands-on clinical training	x	x	x	x	x	x
2. Involvement in the direct work-up of patients (diagnosis and treatment)	x	x	x			x
3. Performing therapeutic and diagnostic procedures	x	x	x	x		x
4. Resident has primary responsibility in majority of cases		x				x
5. Direct diplomate supervision	x	x	x	x	x	x
6. Receiving clinical appointments	x	x	x			x
7. Supervising daily management of hospitalised or laboratory animals	x	x	x			
8. Training rotations in related disciplines and training units	x	x	x	x	x	x
9. Participating in an externship	x					x
10. Performing an extensive amount of laboratory work						
11. Engagement in case presentations	x	x				x
12. Engagement in journal/book clubs (scientific meetings)		x	x		x	x
13. Conference attendance	x	x	x		x	x
14. Attendance of (in-house) resident workshops/seminars	x				x	x
15. First publication	x	x	x	x	x	x
16. Second publication	x	x	x	x	x	x
17. Participation in clinical teaching	x	x	x		x	
18. Giving presentations on conferences	x		x	x	x	x
19. Do a research project	x	x	x	x	x	
20. Write a case report	x	x				x
21. Maintaining a case-log	x	x	x	x		x
22. Maintaining a diary/log of activities (such as clinical service, externship etc.)	x		x		x	x
23. Clinically Appraised Topics (CAT)						
24. Multi-source feedback (MSF)						
25. Direct Observation of Procedural Skills (DOPS)						
26. Case-based discussion (CbD) with colleagues and supervisors						
27. Client survey (PS)						
28. Mini-Clinical Evaluation Exercises (mini-CEX)						
29. Review performance of resident through discussion with supervisor	x	x	x	x	x	x
30. Receiving specialty specific tuition					x	x
31. Practice self-directed study		x		x		x

Table A.4: Results of the ECVS, ECZM, EVDC and the EVPC

Training tools	ECVS	ECZM	EVDC	EVPC
1. Hands-on clinical training	x	x	x	x
2. Involvement in the direct work-up of patients (diagnosis and treatment)	x		x	
3. Performing therapeutic and diagnostic procedures	x	x		
4. Resident has primary responsibility in majority of cases				
5. Direct diplomate supervision	x	x	x	x
6. Receiving clinical appointments	x	x	x	
7. Supervising daily management of hospitalised or laboratory animals		x		
8. Training rotations in related disciplines and training units		x	x	
9. Participating in an externship		x		
10. Performing an extensive amount of laboratory work				
11. Engagement in case presentations	x	x		x
12. Engagement in journal/book clubs (scientific meetings)	x	x		
13. Conference attendance	x	x	x	x
14. Attendance of (in-house) resident workshops/seminars		x		
15. First publication	x	x	x	x
16. Second publication	x	x	x	x
17. Participation in clinical teaching		x	x	
18. Giving presentations on conferences	x	x	x	
19. Do a research project		x	x	
20. Write a case report	x	x		
21. Maintaining a case-log	x	x	x	x
22. Maintaining a diary/log of activities (such as clinical service, externship etc.)	x	x		x
23. Clinically Appraised Topics (CAT)				
24. Multi-source feedback (MSF)				
25. Direct Observation of Procedural Skills (DOPS)				
26. Case-based discussion (CbD) with colleagues and supervisors				
27. Client survey (PS)				
28. Mini-Clinical Evaluation Exercises (mini-CEX)				
29. Review performance of resident through discussion with supervisor	x	x	x	
30. Receiving specialty specific tuition			x	
31. Practice self-directed study			x	x

Appendix 2: The sources of the documents used for the document analysis

European College of Animal Reproduction (ECAR)

- The European College of Animal Reproduction. (2018, September). *Constitution*. Retrieved from https://www.ecarcollege.org/docs/ECAR-Constitution_and_bylaws_2018.pdf

European College of Aquatic Animal Health (ECAAH)

- European College of Aquatic Animal Health. (2019). *Policies and Procedures*. Retrieved from <http://www.ecaah.org/wp-content/uploads/2020/06/ECAAH-Policies-Procedures-2019.pdf>

European College of Bovine Health Management (ECBHM)

- European College of Bovine Health Management. (2021, June). *Policies and Procedures*. Retrieved from <https://www.ecbhm.org/sites/www.ecvdi.org/files/medias/documents/ECBHM/ECBHM%20Policies%20and%20Procedures-2020-06-FINAL%20version.pdf>

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European College of Veterinary Anaesthesia and Analgesia (ECVAA)

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European College of Veterinary and Comparative Nutrition (ECVCN)

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European College of Veterinary Clinical Pathology (ECVCP)

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Appendix 3: The code used for the data analysis

The code which was used to analyse and visualise the data can be found at:

<https://github.com/FransHuntink/SophieDescriptiveAnalysis>

Python along with the Jupyter Notebooks were used, along with the following extensions:

- Pandas
- Numpy
- Seaborn
- Matplotlib

Appendix 4: The questionnaire

The questionnaire is available as an online open-source document. It was not included in text-form in this paper due to the size of the questionnaire. The link to the questionnaire is

<https://drive.google.com/file/d/1OaVSBKo2-LglOer-ko8qIUtKvtM43OaT/view?usp=sharing>