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A road map for future academic veterinary postgraduate clinical training

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SUMMARY

There is a pressing need to redevelop academic postgraduate training structures in veterinary schools in order to allow the profession to become more successful at producing the next generation of veterinary specialists who are also high quality clinical researchers ('clinician scientists'). The development of more effective training programmes is crucially important as clinician scientists are uniquely well placed to undertake research which has the capacity to improve both animal, and human, health. While career pathways exist for vets who wish to undertake more fundamental research, this paper seeks to address problems with existing postgraduate veterinary clinical training structures and proposes potential solutions. It also describes innovative postgraduate clinical training structures which will provide the foundations for a clinical academic career roadmap. This structured and supported career roadmap will enable talented veterinary graduates to progress to senior academic positions equipped with the skills to lead both their clinical services and ground breaking research programmes.

CHALLENGES

There are a number of problems associated with current veterinary postgraduate clinical training programmes:

- 1) Postgraduate students who complete the clinical training programmes, often termed residencies, required to attain a specialist clinical qualification, are rarely retained in academia. They frequently leave to work in private referral practice which means that the next generation of academic leaders is not created and commercial competition to the University teaching hospitals is increased.
- 2) Current residency training programmes are heavily biased towards clinical training with little opportunity to undertake high quality research. The research that is undertaken is often poorly supported both financially and academically, and can result in trainee clinical specialists developing a negative impression of research.
- 3) Only a small number of residents elect to undertake a PhD on completion of their residencies. Those who do undertake a PhD rarely embrace the wider opportunities available to them and infrequently make bold choices to undertake their projects in internationally competitive labs undertaking research which is not necessarily connected to their clinical speciality. As a result, they rarely are competitive with non-veterinary researchers in winning postdoctoral fellowships and grant funding.
- 4) There is a significant financial disincentive to undertake a PhD once clinical specialist status has been achieved. Whilst this disincentive is greatest at the stage when specialists are undertaking a PhD, it persists throughout all stages of an academic career with specialists in private practice generally earning considerably more than their colleagues in academia who have similar clinical expertise and experience.
- 5) It is very difficult for veterinarians who have undertaken a PhD and a residency to continue to develop research and clinical skills in parallel to an internationally competitive level. If they remain in academia, they will typically become a lecturer or senior lecturer, roles that are normally associated with significant clinical, administrative and teaching loads. This leaves little opportunity to undertake further research training (it is rare these days for

veterinary clinical academics to undertake post-doctoral research) and develop independent high quality research programmes.

- 6) Because of the challenge of 'juggling' clinical work, research and teaching, successful veterinary researchers have traditionally not engaged in clinical service work, unlike the situation in medicine. This means that there is a paucity of veterinary academics who can lead high quality, well-funded clinical research programmes ('clinician scientists'). There is therefore a need to create a structure which will allow academics who have a PhD and a specialist qualification to access postdoctoral positions which will enable them to develop into independent researchers whilst maintain their clinical speciality.
- 7) For such a structure to succeed it is essential that clinician specialists who are more focussed on clinical service provision and teaching are as equally valued by the Universities and provided with equivalent career progression opportunities as their colleagues who are 'traditional academics', who undertake teaching and research, and clinician scientists. Clinician specialists (who should also support clinical research) are invaluable within veterinary schools that have become increasingly dependent on clinical services which are financially self-sustaining.
- 8) Importantly, clinician scientists provide invaluable role models to inspire veterinary undergraduates and/or early-years graduates who aspire to pursue a research career.

LESSONS FROM MEDICINE

The closest analogous group to veterinary clinical academics are medical academics. In response to similar anxieties about a crisis in training of medical clinical academics, a more explicit clinical academic training structure has been put in place during the last decade following the Savill and Walport reports on academic medical training, with common principles applied in England and in the devolved administrations of the UK.

- All specialist doctors at consultant level undergo job planning, and for academic staff employed by Universities this is conducted jointly by the NHS and University. The balance of research, teaching, clinical and administrative time for each individual is mutually agreed. NHS-employed consultants (the closest equivalent to veterinary clinician specialists) typically manage and deliver clinical services and are active in teaching. However, all are 'research aware' and many are 'research active', usually engaged in clinical research on patients. University-employed consultants are typically 'research led' and devote a majority of time to research that is embedded in a multidisciplinary research centre within a University; they are active in teaching and participate in the clinical service, typically in a more highly specialised domain than their NHS-employed colleagues.
- Trainees who aspire to specialist careers are likely to decide within 2-4 years of graduation if they intend to train as a clinical NHS-employed consultant or as a clinical academic. Those interested in research have typically undertaken intercalated BSc degrees and have been engaged in research during their undergraduate and postgraduate training. Once they have been appointed to a Registrar-level specialist training programme (the equivalent of veterinary residency), they have the option to step temporarily 'Out of Programme' for

experience in research; many take 3 years to undertake a PhD, funded by a fellowship. Some use 'Out of Programme' time to gain further training in teaching. In England, many trainees benefit from pre-PhD research experience during a National Institute for Health Research (NIHR) Academic Clinical Fellowship appointment. Those who retain the aspiration to be a research-led clinical academic after their PhD will typically have their training post rebranded as a Clinical Lectureship (funded by NIHR or by NHS Education for Scotland), which provides access to the Academy of Medical Sciences Starter Grants for Clinical Lecturers funding scheme and, more importantly, time and mentorship to work towards an Intermediate Fellowship and hence to a faculty position. In the event that early research promise is not fulfilled, or career aspirations change, Clinical Lecturers can move back into the Registrar pool and/or obtain a NHS consultant post.

- The selection of PhD supervisors and projects by medical trainees has come under increasing scrutiny. In the past trainees all too often aligned themselves with clinical professors in their own discipline ('usual suspect supervisors') undertaking unambitious projects with limited training in contemporary cutting edge research. Conversely, trainees in disciplines in which research leaders are rare, usually the 'craft' surgical disciplines, have been disadvantaged by lack of access to such 'usual suspect supervisors'. There is a growing emphasis on a trainee-centred mentorship to identify the interests and talents of the trainee, and align these with potential PhD supervisors who lead internationally competitive and contemporary research within a multidisciplinary research environment.

PROPOSED SOLUTION FOR CLINICAL VETERINARY ACADEMIC TRAINING

Residency programme

- *Recruitment*
Veterinary students with the greatest academic potential should be encouraged to undertake an intercalated science degree when at veterinary schools. They should then be mentored, tracked and recruited into postgraduate research training programmes or clinical training (residency) programmes. A residency appointment process based on committee-based shortlisting and interview panels that include a broad range of senior clinicianspecialists, including members of the relevant clinical speciality, clinician scientists and research active scientists should be encouraged.
- *Residency structure programme*
The over-arching aim of the residency programme is to train veterinarians to become board certified specialists and also to provide them with an opportunity to develop their research interests and skills. The first half of the residency programme should be focussed on allowing the residents to develop their clinical skills and to undertake a clinical research project which will result in a first author publication that is required for their specialist credentials. Mentorship should be provided throughout their residency to help residents decide whether they want to undertake a clinician specialist or clinician scientist track (fig. 1).
 - **Clinician Specialist Track**

Residents on the clinician specialist track will spend four years on a bespoke training programme developing their clinical skills in their chosen speciality. Ideally, they will also undertake a Masters degree by research in order to receive a high quality research experience. The value of a four year clinical residency is recognised by some funding agencies such as the Horserace Betting Levy Board.

- **Clinician Scientist Track**

Residents on the clinician scientist track will have articulated early in their residency a wish to undertake a PhD at the end of their residency. Ideally, they will move straight from a three year clinical residency into a PhD programme. Residents on the clinical scientist track will enter a bespoke mentorship programme which will help them to define their aspirations for research training, and introduce them to a wide range of potential research supervisors in their area of interest. They should be encouraged to develop and submit a PhD fellowship application around six to nine months before the end of their residency. Residents should be encouraged to make bold choices, both in terms of supervisor and project, and to consider a PhD in an environment which is removed from their clinical speciality group. The resident is encouraged to select a supervisor who is undertaking internationally competitive research, has a strong track record of securing substantive independent research funding, is based in a world class research centre and has an excellent track record of PhD supervision and mentorship.

- *Flexibility between tracks and approaches amongst vet schools*

The aim of this two track approach is to provide a clear structure which enables better support to be provided to junior veterinarians who wish to develop careers as clinician specialists or clinician scientists. Residents are encouraged to decide early in their residency as to which track they wish to pursue, but there is inherent flexibility in the system and movement between tracks can be easily accommodated. In some schools there is an expectation that all residents will undertake a four year residency with an integrated Masters; here the decision to undertake a PhD should be taken in the final year of the residency. At the School of Veterinary Medicine in University College Dublin, there has been a move to a Professional Doctorate model of residency training, with residents completing a four-year programme which combines clinical and research components, and culminates with the award of a Doctorate in Veterinary Medical Specialisation (DVMS). The DVMS degree could become an alternative route to combined research and clinical training, and be analogous to the MD degree, already recognised by funding bodies as the equivalent of the PhD for medically qualified investigators.

- *Flexibility of entry points*

This model offers considerable flexibility in career entry points. Veterinarians who have completed a PhD and wish to secure a clinician specialist training programme, can complete a 3 year residency and then be eligible to apply for postdoctoral fellowships or a Clinical Lectureship to help develop their postdoctoral research programme.

- *Integration of other funding opportunities*

This approach allows other funding opportunities to dovetail into this standard training programme e.g. Edinburgh Clinical Academic Training-Veterinary (ECAT-V) training programme (fig. 1).

Clinician Scientist Track

- *Clinical Lectureships*

The post residency, post PhD period is critical for the development of a successful veterinary clinicianscientist career. An increase in the number of Clinical Lectureship posts may help to address the absence of opportunities for PhD trained veterinary specialists to consolidate their clinical and research skills. The concept of the Clinical Lectureship is well established in human medicine thus funding bodies are familiar with their structure and remit. Although features of this post will invariably be different in each school, key features of this position would be:

- The positions are competitively appointed and of fixed duration for two to three years.
 - The job plan will be focussed towards research with only a small proportion of their time been spent undertaking clinical duties. No teaching will be expected apart from final year, case based teaching when on clinics.
 - Research consumable costs and travel expenses will be provided.
 - Positions will be offered to candidates with the potential to secure external postdoctoral fellowship funding – i.e. the positions are seen as short term bridging positions.
- The availability of externally funded postdoctoral fellowships alongside the internally funded Clinical Lectureships provides a framework which will allow PhD trained specialists to advance both their clinical and research skills in tandem. At the end of this 2-3 year period, the expectation is for these academics to be in a position to submit Intermediate Fellowship applications which, if awarded, could potentially lead to a Senior Fellowship application.
 - An alternative approach is to provide clinical leave post-doctoral fellowship opportunities to allow clinical academics with permanent appointments to gain research experience in leading laboratories. These fellowships can be targeted at early career clinical academics who have the interest and potential to develop into successful clinical scientists, but due to historical challenges in the veterinary clinical academic career structure have not been able to obtain high quality, post-doctoral research experience. Fellowships ideally should only be undertaken in world-leading laboratories, and can be hosted at external universities. The fellowships are normally held for 2 years (but can be longer), and provide locum cover to release the clinical academic from their clinical duties, as well as research expenses. The University of Liverpool has supported four such fellowships in the last two years, partially supported by the Wellcome Trust.

Clinician Specialist Track

- *Post residency career development*

Veterinarians completing the clinician specialist track will be expected to secure specialist status and a Masters by research by the end of their four year residency. On completion of

their residency, the expectation is that they will be research aware/informed and be well equipped to engage in clinical research and be key collaborators in research programmes led by clinician scientists. The clinician specialist will be ideally placed to lead clinical trials, develop novel clinical provision, advance clinical practice and improve the student learning experience. Again, there is considerable flexibility between the two tracks and residents who have completed a four year residency and Masters are also well placed to undertake a PhD.

IMPLEMENTATION

In order for this vision to be implemented across the UK, the veterinary schools, funding bodies and industry need to work effectively together in the interests of the next generation of clinical academic leaders. The 2014 BBSRC and MRC review of vulnerable skills and capabilities within the UK bioscience and biomedical research base highlighted the lack of career structure and hence supply of talented individuals with a “holistic understanding of the physiology of laboratory and farmed animals”. Expertly trained and motivated veterinary clinician scientists would be ideally suited to fulfil this need. Within the BBSRC and MRC review reasons such as a lack of career structure and a perceived devaluing of applied research are problems we propose to address. To facilitate this, funding bodies and industry need to work in partnership with universities to create research opportunities at every level from vacation research projects, intercalated degrees through to PhD training posts, postdoctoral, intermediate and senior fellowship programmes.

The challenge to increase the number of postdoctoral trained specialist veterinarians should not be under-estimated. Undertaking high quality clinical and research activities is challenging even in the medical setting which has a much greater critical mass of clinician scientists and access to a wider range of funding streams. However, it is hoped that the approach outlined in this paper provides a structured career roadmap for clinical academics which will inspire the next generation of talented veterinarians to commit to a career in clinical academic research. Importantly, veterinary schools need to demonstrate leadership and bring about culture change in the field of postgraduate clinical training to provide in-house solutions to challenging issues which include addressing the pay differential between private practice and academia, ensuring that University promotion criteria are fit for purpose and recognise equally the talents of all veterinarians in the academic community including clinician scientists, clinician specialists and non-clinical academics. It is hoped that a more structured approach to post graduate clinical training will help UK veterinary schools remain world class, lead in delivery of the One Health agenda and train the next generation of leaders in academic veterinary medicine.

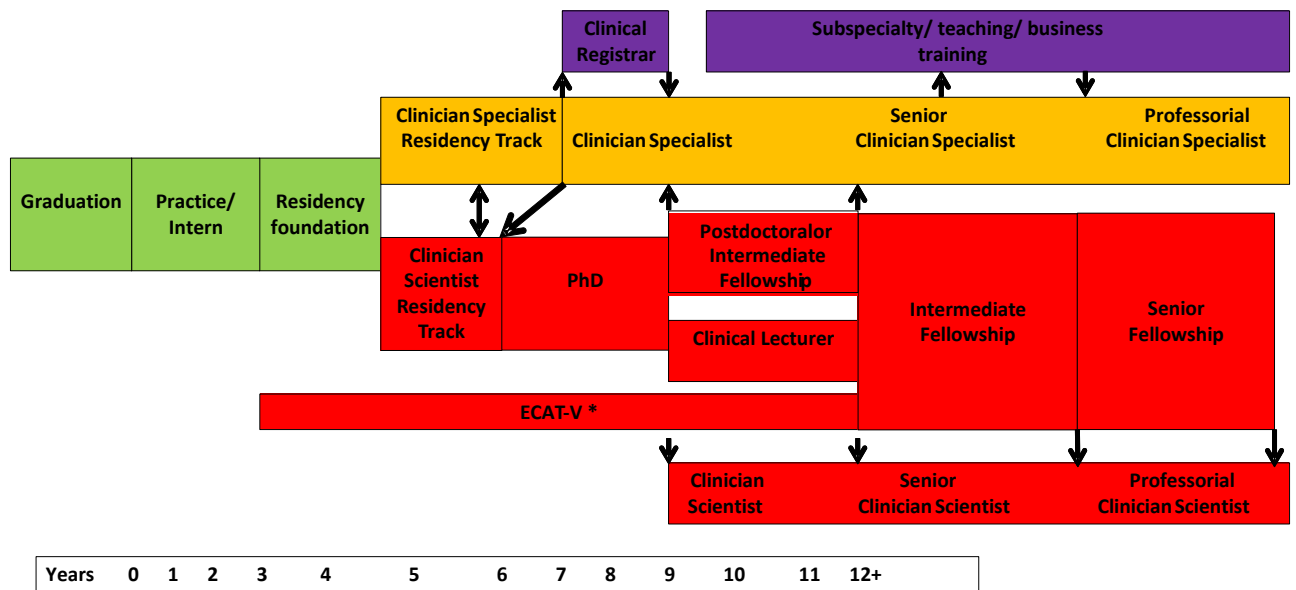


Figure 1 : Proposed roadmap for postgraduate academic clinical veterinary training based on academic postgraduate veterinary training structure in place at R(D)SVS.

* ECAT-V (www.ecat.ed.ac.uk) is a postgraduate training programme run at R(D)SVS which can start either after or before a residency has been completed and will run for 6 or 7 years, respectively. It is a prestigious 6-7 year programme of support for outstanding young veterinarians, jointly funded by R(D)SVS and Wellcome Trust (through the renewal of the PhD portfolio programme for clinicians, which supports medical ECAT Lectureships). This scheme can be accessed by veterinarians who have just completed a clinical residency or by veterinarians who have yet to undertake a residency. In the former scenario, the first year of the ECAT-V programme is spent developing a tailor-made PhD project and the next three years spent focussing solely on their PhD. ECAT-V lecturers will remain in post for another 2 years to allow them to consolidate their specialist clinical skills and continue their research programme with the ambition of developing an intermediate fellowship application. In the latter scenario, the first year of the ECAT-V programme will be spend developing their PhD followed by 3 years completing a PhD. The final three years will be spent undertaking a residency, while continuing to develop research ideas towards an intermediate fellowship application. All ECAT-V trainees join the ECAT cohort with medical trainees and participate in a shared mentorship programme and networking programme. The model of awarding institutions a block grant to manage a portfolio of PhD fellowships, with the benefits of mentorship and tailor-made PhD selection, is now being adopted as the exclusive model for clinical PhD funding by the Wellcome Trust.