

## VETERINARY TEACHING OF BOVINE REPRODUCTION

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### Abstract

Modern veterinary education of bovine reproduction has left the classical teaching of a basically clinical subject towards a herd-health concept combining classical clinical training with animal production, epidemiology, and preventive medicine and population medicine. This change has been forced by new production strategies, a higher degree of consciousness of the producers and other people, often well-trained personnel, interacting with the veterinarian. These changes have been accompanied by pedagogical concepts with new, exciting programmes of veterinary education. At the same time, these changes have caused concern among veterinary establishments, mostly due to the usual high costs of veterinary training. Curriculum changes are sweeping around the globe and new veterinary programmes have appeared. Some of them aim training by a combination of basic education and elective terms while others have focused training in species-oriented tracks already by the time students enter the clinical level. Teaching of reproduction subjects are usually comparative, with major inputs of knowledge from basic, pre-clinical subjects and a substantial clinical training. An early diversification might cause the basis for clinical education to crack and convert the trainee in an operator, rather than an academically trained veterinarian. It is the combination of a thorough clinical training with substantial epidemiological and economical education, all based on proven experience and scientific ground that would guarantee the future of a sound veterinary teaching in bovine education.

### Introduction

Undergraduate veterinary education must be the section of the learning activity of an individual that leads to formal qualification to pursue the activities of a veterinarian. Such a statement defines the undergraduate education as the part of the education an individual undertakes as the beginning of her/his career as a professional, and in this respect it is a general statement that could very well apply to any other profession than the veterinary. What is then causing that around the world veterinary curricula are undergoing criticism and change? Is there any need for such time-consuming, expensive and; for many educators, painful process? Are curricula changes needed for all subjects? or, are these only related to subjects or disciplines that have suffered major breakthroughs due to new discoveries and research landmarks ? Is the curriculum for the classical clinical training spared this turmoil ? After all, the classical view is that a veterinary professional is to be in his core a well-trained clinician, able to take care of diseased animals.

However, the implementation of new production strategies, a higher degree of consciousness of the producers and well-trained management personnel, usually interacting with the veterinarian has now forced the veterinary profession and the

veterinary training establishments to revise the curriculum of undergraduate education, including the clinical education in buatrics and as a major part of the subject, the education in bovine reproduction. Modern veterinary education of bovine reproduction has left the classical teaching of a basically clinical subject towards a herd-health concept combining classical clinical training with animal production, epidemiology, preventive medicine and population medicine. This change has to be seen in the context of new curricula of veterinary education that aim to produce academic professionals trained for a life-lasting learning.

The present paper is a series of reflections by the author that, being far from exhaustive tries to analyse the rationale behind the changes occurring in the context of veterinary undergraduate education. As well, it intends to provide a view, most often very personal, of the ongoing trends related to the veterinary education in bovine reproduction. The paper is expected to be coloured by a European perspective, but hopefully the background of the author will provide some transcontinental insights.

### Veterinary undergraduate education: where are we today ?

Veterinary undergraduate education was established in Europe for somewhat 250 years ago, as an answer to the needs of some parts of the society that needed skilful craftsmen, able to cope with the diseases of the moment. Noteworthy is to remember that veterinarians were, from the beginning, engaged in the establishment of preventive measures for the animal plagues that were a threat for the animal population and the humans that either consumed their products, cohabited with them, or both. From being initially directed towards the equine species for its role in transportation, dragging force and for their role in less noble causes for mankind (wars), due to the recurring epizootics among cattle, more attention was paid to buiatrics, followed by other food-production animals.

Veterinary education establishments, the educators that shape the impact of these establishments, and the veterinary profession as a whole have a lot to be proud of since two and a half centuries ago. The veterinary profession continues to play leading roles in the alleviating the suffering of animals kept for recreational, social or production reasons, on the control of zoonotic diseases, as well as in increasing the animal health status of food-producing animals to such an extent that their potential productivity of human foodstuff has in many countries reached top levels and contributes to a better human health. Veterinarians are also taking part in the development of science, often at the very cutting edge, in areas involving genetics, microbiology, nutrition and reproduction. We continue to produce highly qualified and talented graduates who contribute to society in many different ways. It is our duty to see that veterinary undergraduate education continues to develop to grant the best possible ground for the education of academic professionals. In that duty is included our need to face challenges, making critical analyses of our strengths and weaknesses and formulating imaginative plans to meet these challenges.

Some of the challenges are related to the increasing volume of scientific knowledge, the expectations of the public (as producers, consumers or decision-makers) regarding the level and quality of the veterinary profession and, in relation to this, the increasing interest of the professionals to pursue specialisation after graduation. Furthermore, there is a need for recruiting new educators and

postgraduates that would ensure the function and future development of veterinary education and research.

How is veterinary education facing these challenges ?

Veterinary undergraduate education has always worn a coat of conservatism, which has led to the description of veterinary education as having a non-academic character. Still holding tight to the concept of being the site where professional craftsmen in the veterinary field are trained for life, the increment in knowledge of veterinary science has been caught by educators who are often committed to cover in the undergraduate curriculum every fact about veterinary medicine. Such a position is condemned to failure and alternative solutions are to be, and are being, taken already. Veterinary undergraduate education is still probably one of the most traditional university education, with extensive formal teaching, based up on rigid curricula, and the teaching of facts rather than principles. The new professionals are facing a new world of non-standard problems and their needs for professional activities are getting distant from what has been the rationale of the undergraduate education. Students are to be trained not only basic skills but also of the urging need to seek information, to learn how to learn to make use of the information gathered, and to be better trained in problem-identification, problem-solving and decision-making. In other words, to follow the world-wide trend of life-long learning instead of memorising facts in order to pass exams at the end of their courses.

Educators are aware of these problems and major efforts have been made to change this situation. Among these the increasing awareness for implementing pedagogical approaches such as problem-based learning strategies in the pre-clinical years in order to train the students to study in a different manner as it has been praxis until now. An early exposure to veterinary working fields, to the clinical subjects and a larger degree of interaction between educators from different institutions are also among the implemented strategies. Inclusion of new subjects, breaking or at least opening the old, sacred, borders between disciplines are more common nowadays, as it is the growing interest from students to receive extramural training and the possibility to undertake electives.

However, some of these efforts face impediments, some of them even raised by the educators themselves, and by their innate close relation to the students, by the misunderstanding of the latter. Examples of this are numerous, students find comfortable and safe to receive information via theoretical lectures where the educator tries her/his best to cover everything in the subject, with the false conviction that providing all information is the right thing to do. Such a need for completeness by the educator leads also to their unwillingness to reduce the content of theoretical classes, and ultimately, of their own discipline in the curriculum, unless they are involved in multidisciplinary teaching. Educators must leave such an ideal of full coverage, and replace it by providing the students with the tools they will need to seek knowledge and further information that what is given in the course. Further, educators must remember what they already know, that conversion of information into knowledge takes time. Why this attachment to teaching strategies that most educators know it is not correct ? well, several factors play a role, including the basic fact that there must be a certain educator:student ratio in order to be able to provide the best possible training. The larger the number of students related to the number of teachers the worst would happen; lectures will be the consequence, and demonstrations will replace practicals... Furthermore, low educator numbers are

usually connected to few academic staff numbers per institution, with the logical consequence that these are tied to teaching hours, and where any curricular change, even of a small nature, is seen as a threat and a burden. Sometimes this matter must be handled in two directions, firstly, assuming that numerus clausus must be discussed and accepted as a need and, secondly, understanding that sometimes an academic structure based on larger departments is to be preferred.

Conservatism by the educators and the professionals, together with the fear of the students not to be provided with the best (as broadest) of the curricula impairs the establishment of a core curriculum. Many times this is misunderstood by educators and they usually agree on a document (often very, very large) of a core syllabus, where almost everything is listed for the student to understand she/he must know a bit of everything, so that treating "all creatures large and small" can be warranted... This attitude towards total coverage signals as well a meaning of omnipotency to the students, both those in the undergraduate programme but also those willing to enrol veterinary education. The latter has as consequence that, when numerus clausus has been adopted, most (if not all...) students increase competitiveness when entering the programme and aid maintaining the bad circle.

Educators are not happy about this status quo. Frustration is not infrequent, especially for those subjects that would be considered more "academic" than "craftsmanship-oriented". A visible consequence among veterinary establishments worldwide is the diminishing number of veterinarians wanting to undertake postgraduate veterinary training. Whether this is caused by low salaries among university staff members compared to professional positions is always a matter of discussion, but a fact is that academic positions in the pre- and para-clinical departments are being filled by scientists without veterinary degrees, most often against the clear strategic wishes of the institutions.

### Core curriculum and options for individual programmes in veterinary education

There is major need for a core curriculum, especially when definitions of curricular changes include integration of course components, the abandonment of full coverage objectives are taken. Furthermore, a core curriculum aids the development of elective periods if individual programmes are not to be adopted. With the rapid advancement in knowledge among basic sciences and the development of new technologies in many para- and clinical subjects (including artificial reproduction technologies, specialised surgical sub-disciplines, imaging technologies, etc) the undergraduate syllabus continues to grow. At the same moment there is an increment in the diversity of species the clinicians are to be consulted about so that the chances of reducing the already overcrowded curriculum are rather slim.

The use of a core curriculum provides larger benefits when a problem-based learning strategy has been applied at the beginning of the curriculum. Problem-based learning involves the use of clinical problems (sometimes cases, but these can very well be of a population nature rather than individual) in order to create an active, student-centred learning environment. Considering that most veterinary problems often require an interdisciplinary approach, students learn how to study basic and clinical sciences in an integrated fashion. This learning training is easy to be maintained as a student, since it does not have to be maintained in an organised scheme along the curriculum, but rather be applied by the students themselves after passing the pre-clinical period. Particular advantages of an early application of problem-based learning strategies are self-direction of learning, obtainance of

interdisciplinary knowledge, as well as the development of personal skills, both in an interpersonal plane, as well as an reinforcement of communication skills. Both analytical and technical/clinical skills need to accompany this approach of learning, but a major component is present in the model and should merely be accompanied by a proper hands-in training. The most important point when discussing a learning strategy based in a problem-solving approach is that this is not just another method of instruction (a very common misconception by educators) but a new philosophy of education, where a major component is left to the students, so that they can grow as independent learners.

Provision of electives and/or tracks can individualise the programmes of veterinary undergraduate education. Elective periods, often at the end of a common part of the curriculum and lasting few weeks to 1 or even 2 semesters, help the students to identify an area of particular interest and deepen into it. The area can include courses (either of narrow or broad nature) or activities (primarily skill-training in a particular subject or subjects). In some cases, elective periods are associated (with advantage) to the task of pursuing a project work, also in a subject the student selects her/himself. The introduction of elective periods is a good measure aiming at reducing the omni-competence we have discussed above, but it has shown deviations (add-ons) and it does not necessarily limit the core per se. Tracking implies a new type of curriculum design, where the student opts to emphasise a specific area of veterinary medicine, so that a considerable enhanced level of knowledge is achieved at graduation. Even not being a specialisation (that would be obtained after graduation) tracking takes the student to a more useful level of competence in that particular chosen field, limiting redundant information and facilitating a more focused learning. Its major argument is that it limits information overload in the curriculum. However, tracking is not common yet, and many concerns have been raised in establishments that have opted to consider this option. Firstly, it complicated a rather complex veterinary curriculum and forces the decision by young students (maturity is not an issue to be discussed here, but it has been named) to opt for a track, sometimes rather early in the curriculum. Tracking is at the very end a decision to be made by a certain establishment in the light of the socio-economical values and needs for veterinary professionals. In some areas (as it is the case of University of California at Davis, USA) the practising veterinarian has clearly evolved from an omni-competent, primary healthcare provider for several species, to a single species health specialist, a disciplinary specialist or even a species-specific discipline specialist. However, there are many regions of the world where the predominant need still is for omni-competent, multi-species veterinarians. Tracking will not doubt be discussed further and some establishments in The Netherlands and Italy are approaching a more differentiated form of curriculum. In Utrecht the new curriculum, that ought to be implemented in the next few years, includes a segmented admission (the students will have to decide which track to follow in advance (individual animals, veterinary research, veterinary public health, animal health management and farm animals), enrolling on a 6-years long curriculum. In the first four years the curricula of the different tracks is to have very much in common to undertake a dramatic tracking (including electives) in the last two years.

#### Veterinary education of bovine reproduction

The undergraduate education of bovine reproduction can obviously not escape from the above set of considerations regarding the entire curriculum. Some of the

considerations presented hereby are related to my own Faculty but some concepts are personal and might apply better in other contexts. Provided that an initial period of problem-based learning is present in the curriculum, a lot is gained from the student point of view in applying problems related to reproduction. The rationale behind this statement is the comparative character of the discipline, where species are not necessarily the major point but the problems focus on the veterinary medical aspects of reproduction. Among farm animals, the bovine is probably the one species that would generate more learning material, since it might well cover individual cases as well as population problems, with the social and economical connotations this would involve (farm economics, issues of public health, zoonosis, management, etc). With advantage, an integrative effort from the faculty is to see that educators from the reproduction department interact with this early-located teaching so that the receptivity from the students is enhanced. Also advantageous are periods of auscultation by the students in the pre-clinical stage in selected areas of teaching (topographic anatomy, physiology of reproduction, udder function, etc). Teaching of bovine reproduction must combine classical clinical training on propedeutics and clinics of individual animals with a herd-health concept. In general the training might include a certain number of lectures on conceptual areas of the curriculum, but most time is to be expected dedicated to practical, usually supervised work and clinical work (which should take about 75% of the subject). Modern veterinary education of bovine reproduction has left the classical teaching of a basically clinical subject towards a herd-health concept combining classical clinical training with animal production, epidemiology, preventive medicine and population medicine, including aspects of public health. This change has been forced by new production strategies, a higher degree of consciousness of the producers and other people, often well-trained personnel, interacting with the veterinarian. The training in bovine reproduction must focus on the type of veterinarian the market (hereby comprising the farmers, enterprises, authorities, etc) and the socio-economical environment of the region or country expects from the trained veterinarian. Some areas of reproduction science have developed enormously, often at the edge of new knowledge, including the technologies for assisted reproduction (ART). Some Faculties have, based on their involvement in research in these sub-subjects, increased this part of the discipline in the veterinary curriculum, without paying attention to the above referred need of interaction with the "market" the newly graduated veterinarian would have. Areas such as milk production, herd health, meat production and aspects of public health, animal welfare and economics are to be priority, leaving some other areas for eventual elective periods, within the curriculum. Elective periods should contain combinations of deepening clinical training, not necessarily undertaken within the Faculty (extramural activities) combined with a project work so that the student would have an opportunity to engage in a restricted scientific work. Such a combination would lay a good base for specialisation or postgraduate studies.