

The importance of food animal veterinary education

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Summary

The Bologna Declaration of 19 June 1999 was a pledge, signed by 29 European countries, to reform higher education systems in order to create a European Space for Higher Education by 2010. As the deadline approaches, it is time to specify how the veterinary curricula can most adequately be oriented to adapt to the guidelines of the Declaration. The increasing demand for food of animal origin has made it clear that there is a lack of farm veterinarians in some western countries. Paradoxically, an increasingly 'urban' mentality is developing in the profession and in veterinary education.

In contrast to what happens in the field of companion animals, food animal veterinary education must integrate knowledge and practice in animal production with training in health and population medicine. However, in order to guarantee safety and food traceability from the farm to the fork, priority must first be given to any possible repercussions that might arise from public health issues, and then to profitability.

Keywords

Animal health – Animal production – Farm – Food animal – Food safety – Population medicine – Production medicine – Public health – Traceability – Veterinary education.

Introduction

The evolution of agriculture and animal production systems has been summarised as follows (2):

- pioneering
- production
- productivity
- persistence.

Initially, food production was linked to the use of simple technologies with a trial-and-error approach. Later, in the 19th Century, demographic growth made it necessary to produce more food. Researchers such as Darwin, Pasteur and Mendel contributed to this increase in production. When the problems of overproduction affected different parts of the world in the second half of the 20th Century, the focus shifted towards the quality of the produce rather than the quantity and to developing efficient and

productive systems of food production. At the end of the last century, the most developed economies focused on the sustainability of the production system. Agrarian policies in the European Union (EU) countries began to place the emphasis on environmental, animal welfare, and food safety issues (7).

However, in a recent conference in Rome (10), the Food and Agriculture Organization of the United Nations (FAO) stated that, at present, about 850 million people suffer from hunger, of which close to 820 million live in developing countries. These countries are still experiencing the second phase in the evolution of agriculture and animal production systems, and food production is a pressing need for their societies. The final conclusion of this conference, signed by Heads of State, Prime Ministers and Representatives from 180 countries, declared it unacceptable for 862 million people to continue to go hungry in the world today, and they reaffirmed their

commitment to reducing this figure by half, no later than 2015. This same commitment had previously been adopted in 1996 at the World Food Summit.

What is the role of the veterinarian in this scenario?

The authors sincerely believe that veterinarians must play an important role in this scenario. This means a more comprehensive vision of the education of future professionals, which will involve a departure from the recent predominant tendency in developed countries for veterinarians to be primarily trained in caring for companion and leisure animals, or in other words, in individual animal medicine. Instead, veterinary education should take into account that, nowadays, one of the tasks most frequently requested of veterinary professionals is to guarantee the safety of food production for the consumer, by safeguarding human health without neglecting animal health and welfare. This increasing demand has revealed the inadequate number of veterinarians with specific training and skills in production medicine (15).

Is it possible to detach animal health from production and public health?

In 1936, McCampbell (13) stated that one of the most important problems of food animal management was to prevent and control infectious diseases. Seventy years later, the situation is exactly the same, and veterinary medicine and veterinarians must continue to play an essential role in animal production and management. Furthermore, the situation is much more complex than previously, because in our globalised world, the free movement of people and animals has vastly increased, and along with it, there has been a corresponding exponential increase in the risk of exposure to zoonotic agents. In fact, of the 1,400 pathogens affecting humans, 800 originate in animals. In response to this situation, the role that the EU has assigned to veterinarians is crucial in the planning of a strategy for animal health. An example of this is the resolution adopted by the European Parliament on 22 May 2008 (8). In this resolution, the need to update the minimum standards in veterinary education is underlined, so as to assure the training of professionals who are completely capable of working for the prevention, control, and eradication of the risks linked to animal health.

Salmonellosis continues to be a major concern for the food production industry and can be used as an example of the

extent to which food safety vigilance starts on the farm and ends on the plate of the consumer. In 2006, a total of 160,649 confirmed cases of human salmonellosis were reported in the EU (6), pork meat was one of the major sources of this contamination. We now know that the prevention of salmonellosis begins on the farm, and that it is possible to reduce the prevalence of *Salmonella* by means of appropriate feeding (4). Deficient hygiene during transportation, at the slaughterhouse, or in food processing is another cause of the increased incidence of salmonellosis cases. The training of future veterinarians must provide them with knowledge and practice in pig production, from the farm to the consumer. Thorough knowledge of the nutrition and management of pigs, of hygiene practices on the farm, of animal health, and of ante- and post- mortem inspections at the slaughterhouse and at markets is the way to tackle a zoonotic problem like salmonellosis.

Another good example of the need to monitor a health problem that begins on the farm and eventually reaches the consumer's plate is that caused by *Escherichia coli*, specifically the serogroup O157:H7. In 2006, there were 4,916 confirmed cases in the EU (6), mainly due to beef. Recently, manure has been identified as an important source of this contamination (12). A plan of action designed to reduce the prevalence and magnitude of faecal *E. coli* O157:H7 excretion by live cattle is one of the most effective ways to fight this problem. Preharvest intervention methods can be grouped into three categories:

- exposure reduction strategies, i.e. controlling the quality of water, the hygiene of feed consumed, environmental exposure, animal density, and exposure to wildlife
- exclusion strategies, i.e. the use of probiotics and prebiotics
- direct anti-pathogen strategies, i.e. the use of antimicrobial compounds, bacteriophage therapy or vaccination.

This is another good illustration of how the veterinarian's intervention at farm level is key, both in production activity, as well as in the health control of the animal population.

Is it possible to detach production medicine from animal production?

Lameness is an important problem that greatly affects animal welfare (9). The mean prevalence can reach 25% in dairy cows from farms involved in genetic improvement programmes, where the reduction in milk yield can be as

high as 360 kg of milk per cow and lactation (11). A multifactorial aetiology is involved here, in which it is possible to highlight animal nutrition, the design of the facilities, animal management, and specific animal characteristics (3). Faced with this situation, the problem is not limited to the individual, but affects the herd; thus, the solution must also be collective and not only for an individual.

Another common pathology on dairy farms, mastitis, is representative of how the production process is linked to production medicine. The total loss over the entire lactation period can vary from 110 kg to 552 kg of milk (14). The risk factors involved include the animal itself (breed, herd size, productive level), hygiene and housing design (width and length of resting area, floor characteristics, volume of the barn), mammary gland health, milking management, and the milking machine (5). Once again, the solution to this problem is multifactorial; consequently, if levels of somatic cell counts in the milk tank increase the veterinarian should look for the causes of the problem, and the solution, among the risk factors mentioned. The direct connection between the pathology and the production factors means that the veterinarian must have comprehensive knowledge about them in order to be competent in solving the problem.

Present orientation of veterinary education

The developed countries have, in general, followed two trends in the orientation of veterinary curricula. In North America, and in Central and Northern Europe, veterinary training has focused on clinical training and on specialisation in individual medicine. In Southern Europe, a more general training programme, with a greater balance between the individual medicine of companion animals and the population medicine of food animals, has been chosen. In the latter case, aspects such as animal production, animal health, food safety and public health acquire more importance, while clinical training for individual animals is somewhat more limited.

The two predominant world systems of evaluation and accreditation of veterinary schools, those of the American Veterinary Medical Association and the European Association of Establishments for Veterinary Education, have promoted the standardisation of veterinary training, and this has contributed to the spread of the model based on clinical training and individual animal medicine. This situation has led to an excessive 'urbanisation' of the profession in recent decades, with the resulting change in the vocation, motivation, and present profile of students. In a recent survey of first year students at the Veterinary

Faculty of Barcelona, the female to male ratio was 79:21; with 25% of students from a rural background and 75% from an urban background. Prominent among their favourite professional duties was clinical activity with wild animals and companion animals. Their least favourite duties included veterinary inspection at the slaughterhouse, and poultry and pig production. Paradoxically, only 30% of veterinarians in Spain are involved in clinical activities (1). This scenario forces the academic authorities and professional associations to reflect on the need to inform society about the important functions performed by veterinarians in activities related to public health.

What should food animal veterinary education be like in the future?

Individual animal medicine is certainly an important part of the veterinarian's urban reality. However, the impact of veterinary work on public health is based on animal production and animal health, as well as in population medicine, food hygiene, and food safety, all of which must have an important place in global veterinary curricula.

In effect since January 2006, the new European legal framework, called the 'hygiene package' (Regulations 852, 853, 854 and 882/2004) establishes, for the first time, that all agents who receive an economic benefit from marketing food, including the primary producer, are responsible for its safety. This framework recommends that farmers follow the monitoring and control guidelines on suitable hygienic practices, in which the collaboration of the farm veterinarian is essential. Likewise, public health programmes, which must be based on food inspection and the control of zoonoses, need veterinarians trained in preventive medicine and health policing, risk analysis, epidemiology, pathology, and production medicine, especially in developed countries with intensive production systems.

The Association of American Veterinary Medical Colleges, recognising the lack of veterinarians in production medicine and public health, proposes that in addition to traditional clinical training, more veterinary training in these areas needs to occur by 2025. To this end, the Association is proposing that the curriculum be more flexible, so that in any given country there will be veterinary establishments which provide training in all these professional areas, with the freedom to design their curricula according to their preferences and expertise (16). This proposal openly contradicts the spirit of standardisation of the Bologna Declaration, which was

signed by 29 countries in June 1999 and which promotes a process to facilitate the free mobility of higher education students. In Europe, this agreement of convergence requires that university degrees should be more globally oriented and prepare graduates to exercise their profession, and that specialisation should take place at the postgraduate level.

In this scenario, where veterinary degrees take at least five years, the more balanced curriculum existing in Southern European countries appears to be a more reasonable option, as it allows integration of basic knowledge with practical and comprehensive training, by covering production (ethology, nutrition, breeding and animal health, production, agrarian economy) and animal health (epidemiology, pathology, preventive medicine, zoonoses, and public health). Integration would be helped by species-centred training, principally in the main livestock species (dairy cows, beef cattle, and swine), but also in those species of relevance to individual regions (small ruminants, poultry, rabbits, horses, and fish). The development of practical activities on farms for first-year students could compensate for their lack of knowledge about rural needs. In later years, training must be reinforced with extramural practical activities. In the veterinary faculties that the authors of this paper represent, there are compulsory modules of production medicine, in which students share the activity with farm veterinarians. This has proven to be a good way of showing students the

great social value of the veterinarian who works in production medicine, because their daily activity not only has effects on the farmer's livelihood, and animal and human health, but also on environmental protection.

It is the responsibility of veterinary faculties and schools to educate more veterinarians in order to guarantee the production of safe foods. These graduates should be able to not only improve production, by taking into account a safe environment and animal health and welfare, but they should also know how to lead groups that provide advice on problems and conflicts which might affect public health. Moreover, they should be capable of proposing solutions and handling possible crisis situations efficiently. This requires them to be respected and credible communicators who can filter and transmit understandable information to the consumer. The first step in training veterinary graduates with these qualities is to include leadership and communication skills in the list of abilities that new students of veterinary medicine should acquire. We should train our students to be motivated professionals who are truly enthusiastic about medicine in animal production. If we do not, we will be contributing to an increase in political and economic tension worldwide, and also – due to present and potential food crises – to consumer mistrust, which would consequently endanger the social relevance of the veterinary professional. ■

L'importance de l'enseignement vétérinaire dans le domaine de la production animale

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Résumé

La Déclaration de Bologne du 19 juin 1999, ratifiée par 29 pays européens, affirme l'engagement de réformer les programmes d'enseignement en Europe afin de construire un Espace européen de l'enseignement supérieur à l'horizon de 2010. Le moment est donc venu de définir l'orientation des programmes d'enseignement vétérinaire afin de les adapter aux propositions de cette Déclaration. La demande croissante en aliments d'origine animale a mis en évidence la pénurie de vétérinaires se consacrant aux animaux d'élevage dans les pays développés, où l'on assiste, paradoxalement, à une « urbanisation » excessive de la profession, ainsi que de l'enseignement dispensé dans les écoles et les facultés de médecine vétérinaire.

L'enseignement de la médecine vétérinaire des animaux de rente, contrairement à celle des animaux de compagnie, recouvre des connaissances théoriques et pratiques en production animale qui s'intègrent à la santé animale et à la médecine de population (médecine de la production), en privilégiant les effets sur la santé publique à la rentabilité, afin d'assurer la sécurité sanitaire et la traçabilité des denrées alimentaires d'origine animale « de l'étable à la table ».

Mots-clés

Animal de rente – Élevage – Enseignement vétérinaire – Médecine de population – Médecine de production – Production animale – Santé animale – Santé publique – Sécurité sanitaire des aliments – Traçabilité.

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