

Integrating the issues of global and public health into the veterinary education curriculum: a European perspective

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Summary

Veterinary public health is an essential field in public health activities, based upon veterinary skills, knowledge and resources and which aims to protect and improve human health and welfare. This discipline has evolved through three stages, beginning with the fight against animal diseases, moving on to include meat inspection and control of zoonoses and now encompassing a much broader health sciences education, with the goal of guaranteeing a safe and wholesome food supply, protecting human wellbeing and conserving the environment.

Within the veterinary medicine curriculum, veterinary public health has undergone a similar development. At first, it was mainly concerned with slaughterhouse-based courses but in time it included the teaching of such subjects as epidemiology, the control of communicable (zoonotic) diseases and emergency preparedness. Veterinary medical faculties in Europe have adjusted their curricula over the past few years to reflect these changes in the subject and to meet the need for specialisation. It could be said that veterinary public health education has literally moved from the local abattoir to the global community.

In this paper, the authors briefly discuss examples of veterinary medicine curricula at different universities. The veterinary public health curriculum of the Faculty of Veterinary Medicine, Utrecht, is then discussed in detail, as an example of the European perspective on integrating global and public health issues into the veterinary curriculum.

Keywords

Curriculum – Curriculum development – Education – Europe – One World, One Health – Public health – Veterinary public health.

Veterinary public health: past, present and future

Veterinary public health is an essential field in public health activities, which uses veterinary skills, knowledge and resources to protect and improve human health and welfare. It includes a wide variety of professional areas linking the three elements (the 'health triangle') of humans,

animals and the environment, with all their interactions, for example:

- control of zoonoses
- control of food-borne pathogens and chemical residues
- environmental risks caused by companion animals.

There are many local and regional differences in implementing veterinary public health and recognising its

importance. To aid in a proper evaluation, the authors suggest dividing the evolution of veterinary public health into three stages, which also correspond (approximately) to geographic categories:

- stage one: areas where there is virtually no organised agricultural society nor any systematic government support for the improvement of livestock, food production of animal origin or organised campaigns against animal diseases
- stage two: areas inhabited by a relatively wealthy to rich society, which has legislation governing the areas of public health and animal disease control
- stage three: areas characterised by wealth, highly organised agricultural production systems and the industrialised production of meat and milk.

Stage one: areas with virtually no organised agricultural society

These countries are usually found in the poorest regions of the world because their national income is directly related to production figures in 'agribusiness'. They need not only to feed their own populations (taking into consideration that malnutrition diminishes the health and physical ability needed to produce food) but also to earn money from trade. The lack of sufficient production is known as: 'the devil's circle of poverty'.

In stage one, the major activities of veterinary public health almost completely overlap with those of basic veterinary medicine, i.e. taking care of primary needs at the local level, such as tractive power (transportation, ploughing), food production and the prevention and control of animal diseases (Fig. 1). The principal aim of stage one is 'food security'.

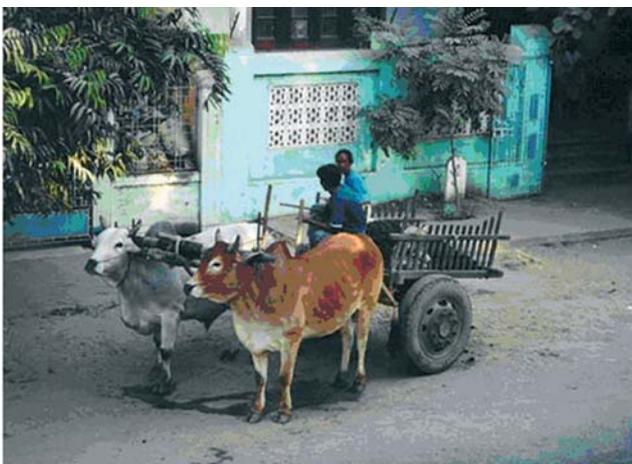


Fig. 1
In stage-one societies, veterinary public health deals with primary needs, such as transportation

Stage two: wealthy societies which have legislation governing public health and animal disease control

In these societies, meat inspection, the destruction of carcasses unfit for human consumption and rendering are well organised, at least on paper. However, quality assurance systems based on good manufacturing practices, hazard analysis critical control points (HACCP) or good veterinary practice do not yet exist. This means that veterinary public health deals primarily with meat (food) inspection and disease control and prevention programmes for at least some major zoonoses. There is an emphasis on preventing human diseases rather than eradicating animal diseases. The diagnostic veterinary skills (pathology, laboratory analysis and diagnosis and clinical experience) form the basis of the veterinary public health system, which is almost entirely disease- and carcass-oriented. The better the organisation in an area, the wider the involvement of veterinarians in food hygiene in general (for example, in fish, vegetables, retail, etc.). The principal aim of stage two is 'food safety'.

Stage three: wealthy areas with highly organised agricultural production systems

These areas normally have large production units, with animals kept indoors, behind microbiological barriers, with controlled feed, water and waste-disposal systems. New animals have quarantine certification, and quality control systems, based on the principles of HACCP and good veterinary practice, are in place. Records are kept for all critical control points and the responsibility for animals, animal products and waste disposal is maintained at the production level. Government controls are designed to oversee the quality assurance system and no longer involve the inspection of individual animals.

In stage three, veterinary public health has developed into preventive population medicine. It is population-oriented, uses epidemiological tools and risk analysis and, whenever possible, policy decisions may be based on calculations drawn from mathematical models (10). Moreover, the public (the consumer) has become a very demanding stakeholder. It is not enough that food should be safe, it should also improve health by being fortified with extra vitamins and minerals, preferably be enriched with pre- and probiotics and be produced with no negative effects on the environment and optimal animal welfare (Fig. 2). The characteristic of stage three is 'food acceptance', i.e. acceptance by the public that a product is suitable for consumption.

Thus, the development in veterinary public health can be summarised as follows:



Fig. 2
Enriched foods, such as this probiotic ice cream, are characteristic of wealthy stage-three societies in the evolution of veterinary public health

- stage one is characterised by organised control and prevention programmes against animal diseases and has the goals of food production, tractive power and transportation
- stage two is characterised by meat inspection and zoonosis control and has the goals of consumer protection and supporting human disease control
- stage three is characterised by the application of the health sciences, and has the goals of guaranteeing a wholesome and safe food supply, human wellbeing, animal welfare and environmental protection.

Training in veterinary public health

Until the year 2000, veterinary public health was hardly visible in most veterinary curricula, with the exception of classical meat inspection procedures. Nowadays, general public health training for veterinarians must include advanced training in the epidemiology and control of communicable (zoonotic) diseases in humans and animals. Biostatistics, environmental health, animal and human nutrition and food protection should also form part of the curriculum. Terms such as the following should be well understood and used correctly in reports and documentation:

- hazard
- hazard identification
- hazard characterisation
- risk
- risk analysis
- risk management
- risk perception by the public and mass media.

Attention should be paid to:

- public health administration
- health legislation
- economics
- occupational health and safety
- health education of the public.

The differences between an individual approach (small-scale husbandry, slaughtering and meat inspection), in which a veterinarian applies his or her diagnostic skills, and the herd or population health-oriented approach, in which epidemiological tools and the certification of quality processing systems play major roles, should be clearly understood. This means a total shift of paradigm.

Veterinary medicine is perhaps the only discipline that can advise on all of the following:

- environmental pollution and protection
- the quality of surface water and bodies of water for swimming
- stray animals
- sylvatic (i.e. wild) animals and their pathogens and diseases
- synanthropic (i.e. ecologically associated with humans) animals and their pathogens and diseases
- companion animal policies in cities
- allergies
- animals in schools
- control of zoonoses
- food hygiene (both microbial and non-microbial contamination)
- ‘petting’ farms and zoos for children
- the social aspects of having companion or sports animals (10).

With the introduction of new curricula, many veterinary education programmes in veterinary schools in Europe have changed significantly. Problem-based learning, specialisation in particular fields and the concept of life-long learning are now key components of the curriculum. In the same way, veterinary public health education has undergone major changes, with the introduction of such subjects as veterinary aspects of environmental degradation, zoonoses transmitted by companion animals and pest control for food safety.

Developments in veterinary medicine curricula, with an emphasis on veterinary public health in Europe

Several universities in Europe have adjusted their veterinary medicine curricula during the past few years. This was prompted by the Vet2020 project, financed by the European Union (EU), which explored the prospective market needs for veterinarians by the year 2020, and the recommendation of the European Association of Establishments for Veterinary Education that the acquisition of basic knowledge of veterinary science should be combined with more advanced training in one field (3). Curricula were further adjusted to keep pace with developments in research (i.e. the vast increase in scientific knowledge), in society (the demands for high-quality service from veterinary clients) and in the veterinary profession, where specialisation in particular species and sectors was becoming more important. New problem-based learning methods were introduced, as was training in communication skills and professional behaviour. Moreover, the idea of life-long learning is now commonly accepted in the profession.

During the Vet2020 project, experts in the veterinary field tried to predict determinant changes by 2020 that would influence the work of the veterinarian. All these experts placed 'food quality and food safety' and 'public health' as the highest priorities in future veterinary education. They also predicted an increase in employment for veterinarians in those fields of about 50% to 60% (3). Veterinary medicine faculties have used these predictions to stress the importance of veterinary public health subjects in the curriculum (2, 4). The Czech Republic now has two separate programmes of veterinary education, offered by the University of Veterinary and Pharmaceutical Sciences in Brno, which direct students into either clinical veterinary medicine or veterinary food safety, hygiene and ecology (11). Both programmes provide a comprehensive level of training, so that all graduates are competent to practise in any area of veterinary medicine. However, each programme offers a deeper and more extended emphasis in one particular area: clinical medicine on the one hand and food safety on the other.

At Ghent University, in Belgium, veterinary public health is part of the core curriculum. In the second part of the fifth year, students must choose a specialised programme of studies. They can select either companion-animal medicine or the production-animal track. (In the latter, they choose a specific field, e.g. horses or ruminants.) However, there are common courses on veterinary public

health that cover health hazards in foods of animal origin and slaughterhouse inspection (7). At Vienna University, Austria, food sciences and public health are a compulsory subject for all third-year students. Students must choose one of the following areas of emphasis:

- clinical veterinary medicine
- food sciences and veterinary public health services
- medical and animal biotechnology and laboratory animal sciences
- experimental medicine and alternative methods to animal experiments.

The sixth and final year is then entirely dedicated to their chosen area of specialisation (5).

All curricula in these schools have veterinary public health subjects in the core curriculum. Most attention is still given to food safety and hygiene but more and more subjects are being incorporated into the study programmes, principally as areas of specialisation, such as:

- the ecological impacts of animals on humans, and *vice versa*
- emerging zoonoses
- water quality and safety.

Such subjects are discussed with students from an international point of view, often using web-based educational tools (6). Veterinary public health problems are not specific to any one country but affect humans throughout the entire world.

Veterinary public health education at Utrecht University, the Netherlands

The Faculty of Veterinary Medicine in Utrecht introduced two major curriculum changes in recent years (1, 9, 10). The first change took place in 1995 and the second in 2001. Veterinary public health education was also significantly affected by these changes.

Before 1995, veterinary public health was virtually limited to knowledge about foods of animal origin. Zoonoses were discussed in the infectious disease programme but almost no references or connections were made to public health. All students worked in a slaughterhouse for almost two months in their final year of study. During this rotation, the emphasis was placed on recognising pathological changes in carcasses and the consequences of these findings for food safety (as in stage two of the evolution of veterinary public health, described above).

In the 1995 curriculum, radical changes were introduced. Veterinary environmental hygiene was introduced as a separate subject, introducing such topics as, for example, the ecological implications of manure disposal and its relevance to public health. The course known as 'Foods of Animal Origin' became 'An Introduction to Veterinary Public Health'. In this course, the slaughter of animals and food safety were still covered but new subjects were also introduced, such as:

- food hygiene
- HACCP
- the public health risks posed by companion animals
- the public health risks posed by wildlife
- bioterrorism
- the global significance of veterinary public health.

Moreover, the focus of the slaughterhouse internship in the sixth year changed from food safety to food quality (see stage three, above).

The introduction of the 2001 curriculum again changed veterinary public health education significantly. Five specialisations or 'tracks' in veterinary medicine were introduced:

- companion animals and equines
- livestock and related animals
- veterinary public health
- veterinary research
- veterinary administration.

The course 'An Introduction to Veterinary Public Health' remained within the core curriculum, as did a two-week internship in veterinary public health in the fifth year. During these two weeks, students deal with:

- slaughter hygiene and controls
- veterinary public health aspects of petting farms and zoos
- zoonoses in veterinary practice
- kitchen hygiene (domestic and commercial) and food safety.

The specialisation in livestock and related animals is the same as the track in veterinary public health, except for the final 32 weeks of the programme. Students who choose the livestock track combine with the students in veterinary public health to follow a ten-week internship in which they study:

- quality control of foods of animal origin
- export certification
- slaughterhouse practices (during a rotation)
- HACCP auditing.

Every subject is discussed from a 'stable to table' perspective, including the global consequences of having or not having a safe and secure food supply.

The specialisation in veterinary public health complies with EU hygiene regulations and includes a practical rotation at the Food Safety Authority. Moreover, it also encompasses world and public health issues, such as:

- emergency preparedness
- epidemiology and the control of communicable (zoonotic) diseases in animals and humans
- international public health regulations
- risk assessment, management and communication.

To confront students with a world perspective on veterinary public health, they must spend at least six weeks of their 32-week programme participating in a course or internship at a university in another country or with an international organisation, such as the Food and Agriculture Organization of the United Nations or the World Health Organization.



L'intégration des problématiques de santé mondiale et de santé publique dans les programmes d'enseignement vétérinaire : le point de vue européen

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Résumé

La santé publique vétérinaire constitue un champ important de la santé publique, qui mobilise les compétences, les connaissances et les ressources de la médecine vétérinaire pour protéger la santé et le bien-être des populations humaines. Cette discipline a connu une évolution en trois phases : à la lutte contre les maladies animales se sont ajoutées les activités d'inspection des viandes et de lutte contre les zoonoses et, plus récemment, d'autres aspects plus généraux des sciences médicales, dans le but d'assurer la sécurité sanitaire des aliments, de préserver la qualité de vie des populations humaines et de sauvegarder l'environnement.

L'enseignement de la santé publique vétérinaire dans les programmes des écoles et des facultés vétérinaires a connu une évolution parallèle. À l'origine, les cours portaient essentiellement sur les activités à mener dans les abattoirs ; progressivement de nouvelles matières se sont ajoutées au programme, telles que l'épidémiologie, la lutte contre les maladies transmissibles (zoonoses) et la préparation aux situations d'urgence. Les facultés de médecine vétérinaire en Europe ont récemment procédé à une réforme des programmes d'enseignement afin de tenir compte des changements de cette discipline et de répondre au besoin croissant de spécialisation. On peut affirmer que l'enseignement de la santé publique vétérinaire s'est littéralement déplacé de l'abattoir local à la communauté mondiale.

Les auteurs exposent brièvement quelques exemples de programmes d'enseignement de la médecine vétérinaire mis en œuvre dans différentes universités. Ils analysent ensuite en détail le programme de santé publique vétérinaire de la Faculté de médecine vétérinaire d'Utrecht, pour illustrer le point de vue européen sur l'intégration des problématiques de santé publique et de santé mondiale dans les programmes d'enseignement vétérinaire.

Mots-clés

Conception de programme – Enseignement – Europe – Programme d'enseignement – Santé publique – Santé publique vétérinaire – Un monde, une seule santé.



Integración de los temas de salud pública mundial y veterinaria en los planes de estudios veterinarios. El punto de vista europeo

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Resumen

La salud pública veterinaria es una vertiente fundamental de todas las actividades relacionadas con la salud pública. Tiene por finalidad proteger y mejorar la salud y el bienestar de los seres humanos, y su buen funcionamiento exige múltiples aptitudes, conocimientos y recursos en el terreno de la veterinaria. En su evolución, esta disciplina ha pasado por tres fases,

empezando por la lucha contra enfermedades animales, pasando después a incluir la inspección de productos cárnicos y el control de zoonosis y acabando, hoy en día, por dar cabida a una concepción mucho más amplia de la enseñanza de las ciencias de la salud, con los objetivos de garantizar un suministro inocuo y saludable de alimentos, proteger el bienestar de las personas y resguardar el medio ambiente.

La salud pública veterinaria ha seguido una evolución similar dentro de los planes de estudios de veterinaria. En un principio, la disciplina giraba esencialmente en torno al trabajo en los mataderos, pero en su momento evolucionó para poner el acento en la enseñanza de temas como la epidemiología, el control de enfermedades transmisibles (zoonóticas) o la preparación para casos de emergencia. En los últimos años, las facultades europeas de medicina veterinaria han modificado sus planes de estudios para dar cabida a esos cambios y responder a la necesidad de una mayor especialización. Cabría decir que la enseñanza de la salud pública veterinaria ha pasado literalmente del matadero local a la comunidad mundial.

Los autores, tras exponer someramente los planes de estudios veterinarios de distintas universidades, examinan en detalle el de la Facultad de Medicina Veterinaria de Utrecht, tomándolo como ejemplo del punto de vista europeo sobre la integración de los temas de salud mundial y pública en los planes de estudios veterinarios.

Palabras clave

Elaboración de planes de estudios – Enseñanza – Europa – Plan de estudios – Salud pública – Salud pública veterinaria – Un mundo, una salud.



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