Veterinary public health perspectives: trend assessment and recommendations

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Summary: In a world of increasing populations, new patterns of land use and new biotechnologies, the orientation towards population veterinary medicine within the health triad of environment, animals and people will be of growing importance. This orientation should be accompanied by a dramatic expansion of veterinary public health (VPH) practices and considerable modification of veterinary training, with emphasis on interdisciplinary approaches under multifocal leadership. A high level of specialisation and, at the same time, integration into the major goals of the health triad will be important factors. The management of integration will also influence the coherence of the veterinary profession in research and education.

Major issues in VPH concern new biotechnologies, urbanisation (particularly in developing countries), the control of "hidden infections" entering the food chain, new agricultural practices and ethical questions associated with these developments.

KEYWORDS: International organisations - Public health - Veterinary education - Veterinary services.

INTRODUCTION

Analysis of potential and actual trends in veterinary public health (VPH) should, as far as possible, distinguish between the following concepts:

a) VPH as a scientific orientation in research, education and practice
b) VPH as a service of governments, communities and civic organisations
c) VPH as a defined structural element in public administration, e.g. a VPH section in a Ministry.

THE TERM "VETERINARY PUBLIC HEALTH"

Veterinary public health (VPH) unites public health (activity orientation) and the veterinary profession (educational discipline) in a logical manner, as "a component of public health activities devoted to the application of professional veterinary skills, knowledge and resources for the protection and improvement of human health" (17).
As this definition of VPH is unique and specific, it is difficult to conceive of an alternative term. No other term would account for VPH activities with similar or better precision, nor is there any indication that the concept will undergo such drastic change that a merger with other disciplinary terms becomes necessary.

The utility and need for the term VPH depend on the further evolution of the two elements defining it, namely "public health activities" and "veterinary science and resources". Future use of the term will also depend on the evolution of other, competing disciplines and scientific areas, although such developments are slow and difficult to predict. The reader should bear this in mind when confronted with trends and proposals describing new orientations of veterinary and health activities.

At present we may note a trend towards reintegrating various sub-disciplines of the veterinary profession as far as civilian services are concerned. The term "Official Veterinary Service" was proposed in an OIE publication by the late P.N. Acha (1). Discussions between the World Health Organisation (WHO) and officials in the United States on the "Pew" Report (see below) have suggested further integration of all public veterinary practices, whether executed by an Official Veterinary Service or by the private sector (16). Driving forces behind these trends are population and environmental orientations in veterinary medicine. There is a general consensus that such trends towards integration are necessary to counterbalance (or counteract) a disintegration of professional coherence in education and practice.

There is also a trend towards greater emphasis on VPH. In recent years, WHO has promoted integration of the techniques of management and social sciences as well as those of epidemiology. This has resulted in the complex approaches of:

a) systems research and programme planning, integrating managerial tools (5, 28)

b) animal production and product hygiene, integrating animal production and food safety (19, 23, 25)

c) a new and broader concept of the health triad of environment, animals and people (with reference to an overall quality assurance system).

It remains to be seen to what extent these initiatives will succeed and how they will affect the applicability of the term VPH.

**VETERINARY PUBLIC HEALTH PRACTICE**

Trends in the evolution of human settlements and patterns of agricultural land use permit us to predict a dramatic increase of VPH practices in the coming decades. Irrespective of the distribution of functions between the governmental and private sectors, five aspects should detain our particular attention.

1. As urbanisation proceeds at a significantly higher rate than the overall growth of the human population, greater demands are placed on meat and milk hygiene, food quality assurance, population management of pet and pest animals, and animal welfare. The risk of health hazards and the frequency of diseases related to synanthropic animals (e.g. zoonoses, bites, allergies) will increase considerably.

2. The control of "hidden infections" such as brucellosis, salmonellosis, toxic *Escherichia coli* infection, campylobacteriosis, listeriosis, toxoplasmosis, Q fever and
diseases caused by biotoxins entering the food chain, may become the greatest challenge to the veterinary profession. Proper responses to these infections and intoxications require field and laboratory infrastructures of relatively high sophistication, since these conditions are not readily detectable by clinical symptoms on the farm, nor by pathological signs at slaughter.

Disease-specific and general measures of animal genetics, production and product hygiene will have to be coordinated to counteract the spread of zoonotic diseases and cross-contamination along the food chain.

3. New agricultural practices are evolving for which the public health consequences have yet to be elucidated. Thus aquaculture is presently the most rapidly growing subsector in agriculture. Often an intermediary in the recycling of human and animal wastes or an adjunct to other agricultural practices such as wet rice farming, aquaculture will challenge VPH in many aspects of zoonoses control, residue control and the prevention of long-term environmental damage (3, 15).

4. There is greater interest in ethics related to agricultural practices, pet and laboratory animal care, new biotechnology and the conservation of nature. This occurs at a time of unprecedented increase in populations requiring shelter and food and a concomitant progress in science and technology. This progress gives hope of solutions but also carries further potential risks.

The compromise between quality and quantity of production is far from clear under these conditions, and VPH functions in the veterinary profession will have to be based on respect for the health triad of environment, animals and people. Ethics and politics need to become stronger elements of VPH.

5. In order to cope with the increasing demand for VPH practices, the veterinary profession must adopt new approaches in its collaboration with the community and other disciplines. Professional isolation will downgrade specialists to technicians capable of conducting tests or using instruments but otherwise replaceable by machines. VPH must turn towards "integrations", joining food chain and environmental health partners in systems ensuring quality and safety. Such integration, though still in its beginnings, is being introduced. Examples are quality assurance systems for food, and the WHO "healthy cities" project resulting from the 1986 Ottawa Conference on "Health promotion: the move towards a new public health" (29).

For the veterinary profession this trend may include a gradual shift from veterinary police action to community participation which will eventually dominate official functions. Dog population management based on responsible dog ownership (31) and public cooperation in dog rabies control (26) may serve as examples. The development of research and practice in this field shows that we are beginning to understand and apply sound ecological and social procedures to dog rabies control. Measures taken in the past in many parts of the world to control stray dogs had no effect on the density of dog populations, and proved counterproductive in the social context (24).

There are other similar lessons showing that new developments must not only be foreseen, but scientific and strategic errors of the past must be corrected.

Future trends in VPH are relatively clear. The increasing importance and impact of VPH in a world of rapidly evolving risks for the environment, animals and people is indeed a compelling reason for the present OIE publication.
Each country of the world will choose items from the range of future directions for VPH activities, based on its specific cultural and economic setting. The topics discussed below are domains requiring thoughtful preparation and action in veterinary education and services to the public. We are confident that the veterinary profession will meet these challenges.

**RESEARCH AND EDUCATION**

Although the perspectives of VPH are determined by social, population and environment-oriented elements (including health, economics and lifestyle), the future significance and role of VPH will depend upon research and education. In this respect VPH should be seen not in isolation but in relation to specific trends in the broader areas of both veterinary medicine and public health.

Without going into details on the new biotechnologies, emphasis should therefore be placed on some decisive intellectual developments.

**Major research efforts related to VPH perspectives**

During the past decade, enormous efforts have been made by some leading institutions to adjust veterinary education and training to rapidly changing ecological and socio-economic conditions.

Because of the interdisciplinary and intersectoral character of VPH, major research programmes and guidelines for re-orientation of the veterinary profession were initiated by WHO about two decades ago, and various guidelines and publications were produced (Appendix I). Since the veterinary schools failed to adapt their curricula, emphasis was eventually placed by WHO on continuing veterinary education as a means for preparing the health sector and the veterinary profession for immediate and future tasks. Epidemiology and management sciences, with their links to economics, social and environmental sciences, became major areas of research and future development in VPH.

A milestone in research and training of the veterinary profession was the Expert Consultation on Veterinary Education organised by the FAO in Nairobi in 1984 (8). The profile of the future veterinarian for Africa was discussed and identified as including particular skills in:

- preventive medicine, based on new concepts of community participation
- epidemiological foresight
- management of disease surveillance and control.

The discussions at that meeting revealed that, with the exception of some postgraduate training, no veterinary schools were preparing the next generation for such skills and functions. A joint research project coordinated by WHO, FAO and the World Veterinary Association confirmed that appropriate schemes of continuing veterinary education were either totally lacking or did not include the required subjects (11).

A WHO investigation on the extent and content of training in veterinary epidemiology at European and American veterinary schools gave only a slightly more
optimistic picture for developed countries (27). This subject is still largely considered as synonymous with biostatistics, which most students find too abstract and boring. This is regrettable because veterinary epidemiology could be most fascinating if veterinary medicine was linked to current problems facing the health triad of environment, animals and people.

A third element in these discussions was provided by the OIE in a series of descriptive and analytical papers on the organisation of Veterinary Services, stressing the gaps between administrative systems and the actual needs of societies, and proposing solutions to this problem (12). Although these documents dwell primarily on aspects of animal health and productivity, the conclusions are equally important for VPH. As mentioned above, training in strategic management processes was specified in the OIE publication, and it is worth recalling Acha’s statement that strategic management, even if unsuccessful, is an important vehicle for the learning process (1).

The fourth major and perhaps most profound and alarming analysis originated from research on trends and needs of veterinary education and training in the USA. The “Pew” National Veterinary Education Programme for the USA, henceforth termed the Pew Report, was issued in December 1988 (14). It is a forward-looking, in-depth analysis of directions for the veterinary profession of an advanced industrialised country, in order to meet the needs of society in the next decade and in the twenty-first century. Many of the thirteen recommendations (Appendix II) of the Report are applicable to other countries besides the USA, especially industrially and agriculturally advanced nations. Thus Recommendation No. 12 states: “Change the emphasis in the veterinary curriculum from almost total concentration on clinical practice to include important public sector needs for veterinarians”. The report adds: “Public sector veterinarians will bring strong scientific and technical competency to public disease control and to public health agencies which increasingly will function as information intensive agencies. Skills in epidemiology, economics, sociology, information management, risk assessment, public policy, legal concepts, and in other biological, medical, and social science disciplines also will be required by many of these veterinarians”. This statement is important because it applies to VPH at the international level, which in turn extends to relevant sectors at national, provincial and local levels.

Many recommendations made in the Pew Report also apply to less developed and other countries. Some of these are: changing the focus of the veterinary profession from animal disease to animal health; the fostering of research; strengthening the general education of veterinarians; and developing a national perspective on strategy of veterinary education. With respect to VPH, the Pew Report should be supplemented by more emphasis on comparative medicine (human and animal), ecology, animal production hygiene and consumer protection. These subjects are referred to in the following sections.

**Epidemiology and surveillance procedures**

New techniques in diagnosis, employing defined molecular reagents, monoclonal antibody and new ways of visualising diagnostic reactions, have opened a new era of disease surveillance. Unfortunately, the managerial process has not kept pace with this rapid development, so that full advantage is not taken and further technological development is hampered. This failure is only partly due to lack of funds or
infrastructure. Veterinarians are generally not trained in managerial processes and their activities tend to involve clinical health care and regulatory principles.

Case notification and specimen collection are organisational areas where tools for community participation are of utmost importance. Too many laboratories receive diagnostic material in too small amounts for epidemiological surveillance to be useful. Active surveillance services must be developed systematically.

The WHO Consultation on Development and Training in Veterinary Epidemiology held in 1990 in Hanover defined seven subject areas which should be taught (with varying degrees of intensity) for certain specialisations of the veterinary profession (27). Apart from basic instruction at veterinary schools, there are six categories for which specific schemes of continuing training in veterinary epidemiology should be instituted (Appendix III). Future development calls for well harmonised training modules for this purpose. With the help of leading national services and its own network of collaborating centres, WHO is promoting the development of such training modules in order to link epidemiology with management, economic, social, communication and other population-oriented sciences as well as environmental health.

Management science in veterinary medicine

Having identified the need for population-oriented approaches in veterinary medicine, the gaps in our knowledge and use of management tools become obvious. Here is perhaps the greatest challenge for the profession. We tend to believe in our classical veterinary skills in clinical, microbiological and toxicological medicine, and in our humanitarian mission, whereas other disciplines which promote management and communication sciences can teach us a lesson even in the domains of social science and economy. These were, in fact, the original and traditional areas of interaction of rural veterinarians. Economics is a basic consideration in the interactions between the farmer and veterinarian.

Focusing today on population medicine, particularly in developing countries, we constantly notice the gaps in our knowledge. WHO has therefore devoted much of its VPH capacities to principles for planning, organisation and management of veterinary public health programmes.

In the mid-1970s, WHO began to develop and issue guidelines on intersectoral cooperation in specific VPH areas (Appendix I). One of the most difficult problems concerned horizontal, cross-sectoral approaches in food hygiene (19), primary health care (6), VPH in urban areas (30) and salmonellosis prevention and control (10).

Specific managerial procedures were the next phase of development, starting with the concept of a "hazard analysis critical control point" (HACCP) in food quality assurance (23). Irrespective of a particular disease, different WHO Expert Committees have recommended tools for programme planning and management (18), the application of these tools in national programme planning and management (20), their eventual use in largely community-based programmes (22) and systems of extremely complex structures and resources (25). The first management guidelines for dog rabies control (24) and for VPH programmes in general resulted from this development (6). As a logical consequence, systems research received particular attention as a scientific approach and management tool, providing new perspectives for objective-oriented activities and calling for partnership between different services
and the private sector. New terms and concepts arose, such as lifestyle, multifocal leadership, resource mobilisation and assignment of responsibilities. Greater emphasis will be needed in future on community participation and on education in communication sciences. A first document on this subject has been made available by the VPH section of WHO (26).

The most recent development involving VPH is quality assurance systems for all or part of the food chain.

Closely related to this subject is training towards better approaches, or even reconstruction of veterinary systems and the management process (1). In this paper, Acha advocated training in systems research and management at a high strategic level for the improvement of veterinary administration and functions. Such a management process is concerned with the animal production sector, the consumer and the environment. Six broad topics would, if pursued in succession, provide information on strategic decisions to be taken, namely:

1. Identification and analysis of gaps and failures of cooperation between public institutions and animal industry
2. Planning of improvement
3. Construction of strategies for implementing selected solutions
4. Management process in the Veterinary Service
5. Epidemiological surveillance system
6. Development of capacities for cooperation with the producers.

In Europe, an Interdisciplinary Working Party (IWP) on Food Safety and Quality has been established and the Chief of the VPH Section of WHO undertook the Chairmanship for the initial phase. To attain its objectives, the IWP brings together a wide range of interested associations and institutions, whether they are supranational, national or infra-national federations, governmental authorities or individual institutions. Participation of consumer organisations in the IWP is essential. At this stage, the IWP should be seen as European with a wider international section. On 4 March 1991 the IWP adopted the following objectives, which represent a significant progress in the agreement of consumer organisations and industries on the need for joint action by participants in the food chain (9):

1. To contribute to ensuring that food is known to be safe throughout the food chain:
   - by stimulating integration of quality assurance systems, such as HACCP and the international standard, ISO 9000
   - by encouraging surveillance and monitoring systems for preventing food-borne diseases and risk factors
   - by determining and fostering research work in the public interest
2. To provide information, especially to consumers, on actions taken or to be taken along the food chain
3. To prepare and initiate corrective actions as appropriate.
A rough layout of the food chain and the bipolarity (plus or minus) of food chain links and partners is shown in Fig. 1. Factors affecting quality assurance under adverse and supportive conditions are also shown. This pattern of food chain partners can be extended and further detailed as appropriate. The most important conclusion from analysis of a quality assurance system is the fact that we are dealing with a complex tree whose roots can be almost endlessly subdivided into branches of offer and demand until reaching zero levels of skill, information, facilities and equipment. The system is therefore much more complex than a single production line within a food-processing plant. Nevertheless, the same managerial procedures can be applied to define, control and certify the quality and safety of procedures and products all along the food chain.

**Systems approaches: a new philosophy and strategy**

Perhaps the greatest challenge and need for future developments concern the composition of technology and management in respect to the complex health triad of environment, animals and people (Fig. 2). Disciplinary interests give way to a new philosophy of a partnership of our profession in respect to domestic animals, human beings and nature. Research defines the role of each subsection in this triad and its complementary function. Disciplinary thinking and defence of areas of competence is thus gradually replaced by responsibility-sharing, together with other disciplines, for the whole health triad. Multifocal leadership regarding sub-objectives replaces the traditional forms of leadership. Thus central leadership questions are of secondary importance, if not counteractive to this new philosophy. The initiative for the health triad as a whole is the basis of our orientation. In many technical fields this systems approach means changes of revolutionary magnitude. Consumers become equal partners in determining the interaction between farmers, pharmaceutical industries and veterinarians. Conservationist movements take part in the decision-making process between consumers and farmers and other partners of the food chain. The management process of quality assurance as described in the preceding section is an example of the need for systems research and approaches.

Veterinarians would participate in various subsectors of the food chain. We need training in vertical systems approaches from feed to table, in quality control and assurance systems within each production subsector and throughout the food chain. Specialisation is necessary, together with total integration into ecological and social systems on which the health triad is based. This can function only if leadership fosters the responsibility of all persons involved, and if partnership prevails in management, with attention to health objectives. Obviously the increasing significance of multidisciplinary and multifocal conditions is a great challenge and surely beneficial for the coherence of the veterinary profession and in particular for VPH. It would be salutary for the World Veterinary Association to assume an active role in bringing about these innovations.

**Control and elimination of major zoonoses**

The zoonoses causing the greatest problems for human health and the greatest economic losses (animal illness and death) are brucellosis, rabies, salmonellosis and hydatidosis. These diseases have been dealt with extensively by WHO (Appendix I) and many research projects are underway to improve procedures for their control. Technological trends are described in many publications of the FAO, OIE, WHO and other organisations. Clearly, the least developed countries (LDCs) affected with these diseases should prepare for and take cost-effective action as soon as possible. This
Consuming, cooking

Retailing

Processing

Harvesting / slaughtering

Producing

Disease control

Productivity protection

Feed, fertiliser

Parent stock/seed

Environment

Animal origin

Plant origin

Feed

Additives

Spoilage control

Supportive conditions

Interaction

Consequences

Adverse conditions

Interaction

Consequences

donor

malfactor

donor

malfactor

consensus

progress

recipient

victim

Food quality assurance

FIG. 1

Food chain patterns
Remark: Major components such as plants and animals or domestic animals and wildlife are transposable in the triangle as long as they do not lose significance in interaction. In respect to human and animal infectious diseases and to risks due to intensive animal production, version I best reflects the reality and provides a guide for systems approaches. Without impairing the triad's complexity, other ecological components may be brought into the foreground, e.g. plants, marine life, wastes, stratosphere, as shown in the example of version II.

FIG. 2
The health triad
(structure, functions, interaction)
requires training and application of health systems research, a basic scientific tool which should be promoted in all countries (28). In many LDCs, an analysis of the costs of eliminating rabies from the dog population are less than those of the existing (though only partly effective) service of human post-exposure treatment (7). Similar results have been obtained in several countries for the cost of brucellosis vaccination in animals, contrasted with the treatment of human patients. This shows that intersectoral systems analyses are not just hypothetical.

New and emerging diseases

An “emerging” disease is “new” only when it is first recognised. The causative agent may well have lived and reproduced for a long time undetected in the environment and in a particular host under conditions of a specific host-parasite equilibrium (this is probably true for most zoonotic agents).

When humans enter new territory such as virgin forests in Brazil or Africa, “new” diseases can “emerge” through infection of man (as a new host) from animal reservoirs (e.g. monkeys). Mutations are constantly occurring in all reproducing microorganisms, and pathogenic microbes possessing new properties can and do result from genetic recombination, for example, in influenza viruses. Surveillance activities are therefore necessary and should be a permanent feature of all future VPH activities.

THE VETERINARY PUBLIC HEALTH SERVICE SYSTEM

VPH functions and practices in the private sector should be distinguished from the structures of governmental and subgovernmental public services executing VPH functions.

Reviewing the national VPH services in different countries, it is obvious that VPH functions are rarely coordinated by a single service, division or office, but are often distributed between several offices and laboratories. The fact that the VPH sites in national services all carry other titles is perhaps a minor problem for the reviewer. The description of the service pattern becomes much more difficult where VPH functions are taken care of by different professions. Unfortunately, the delineation of areas of responsibility in science, education, administration and actual practice remains largely unclear under such conditions and can give rise to controversies.

It is reasonable to assume that more and more governmental agencies will include or strengthen VPH services as a consequence of disproportionate, rapid progress of urbanisation. Local Veterinary Services in urban areas will be concerned almost exclusively with VPH elements of the veterinary profession.

The complexity of services to be rendered in rural and urban areas can best be demonstrated by the need to control hidden infections which may enter the food chain, or become amplified at many points along it. Because of this complex epidemiology and the divergence of technical specialisations required for control, it is not surprising if up to seven Ministries maintain services, including laboratories, to deal with the control of a distinct zoonosis such as salmonellosis. Such services may be found under the Ministries of Agriculture, Health, Municipality, Education (veterinary schools), Trade (export/import), Interior (test standardisation) and Defence. There is no indication that such “diversification” and/or “disintegration” will be reversed.
Unfortunately, such multifocal services concerned with VPH have, in many countries, no working contacts because integrated systems are largely missing or inefficient.

The perspectives are clear. The veterinary profession engaged with VPH operations of national and local services must work to provide essential coherence, particularly in view of the quantitative and qualitative increase in VPH functions. Vehicles for this coherence are epidemiological surveillance services, integrations (e.g. for food quality assurance) and associations of civil service veterinarians or VPH practitioners, and scientific associations.

In most countries, it would be helpful if positive attitudes would prevail in the cooperation between the Veterinary Service of the Ministry of Agriculture and VPH officers in the Ministry of Health and the large communities. The problem of intersectoral cooperation has been the subject of various meetings and documents in the past.

No generally applicable solution has yet been found. However, it is worth noting that some recent efforts in this direction try to englobe all veterinary activities of civil services under the term “Official Veterinary Service” (OVS) or even to include all human population and environment-oriented activities of the private and civil service veterinarians under the term “public veterinary medicine” (PVM) (16).

It is understandable that the paper in the OIE Scientific and Technical Review on “Organisation of Veterinary Services for the future” (4) recognises in its projects one Veterinary Service without subdivisions. Acha, who devoted the major part of his professional life to VPH, likewise does not subdivide OVS in his reflections on “A strategy for Veterinary Services to meet the requirements of a changing world” (1). He concludes that administrative innovation “must start from a strategic understanding of the relations of the OVS with the animal industry, human health, protection of the environment, and everything affecting national policies for economic and social development”.

Whereas the OIE is oriented mainly towards surveillance and control of notifiable diseases, i.e. official functions, the broader issue of coherence of the veterinary profession in education and functions was examined by the Pew Report (14) and subsequent meetings with WHO collaboration on a “plan of action for public veterinary medicine”. A working group on this subject met in October 1989 in Fort Collins, Colorado (USA) (16). With the support of the United States Department of Agriculture (USDA) and the Association of American Veterinary Medical Colleges, a basis has now been found in the United States for the continuing involvement of the whole veterinary profession. The American Veterinary Medical Association pursued the matter of services and private sector coherence at a meeting held in College Park, Maryland (USA) in 1991 (2).

The objective of coherence and integration is not to abolish, but to counterbalance the influences of specialisation and isolation of veterinary functions in different national services.

The value of a coherent service or professional orientation has led to a pertinent recommendation on VPH organisation and structure in the Arab States. Based on experience gained in countries of the Eastern Mediterranean region, the participants of a 1983 workshop concluded that “the establishment of VPH units within the national Veterinary Service in Ministries of Agriculture had proved to be very
successful, especially where the Veterinary Service as a whole is oriented to public health”. This offers an alternative to previous recommendations for VPH units to be established within the public health sector (21).

It is important to note that VPH units outside the Veterinary Services tend to fail if they try to execute functions with insufficient manpower. Such VPH units should be involved mainly in the harmonisation of regulatory issues and act as a liaison office between the administrative sectors. However, if a government opts for a VPH unit within the main Veterinary Service, care should be taken that the Veterinary Service assigns a high-ranking official to the public health service on a rotational basis for the essential liaison function. Abundant experience in diplomatic and military services shows that such a system of detached duty can be most effective. An official seconded to the hierarchical structure of the cooperative sector should retain his career prospects in the seconding sector, so that the psychological problem of separation in functions and career does not arise.

The potential of such liaison services may be deduced from the comprehensive description of VPH in “Health programmes development” for the Americas, which includes a chart on VPH programme linkages (13).

**CONCLUDING REMARKS**

1. There is at present no adequate substitute for the term “veterinary public health”.

2. In education and research, VPH perspectives are clearly determined by veterinary medicine as part of its integrating functions in the health triad of environment, animals and people.

3. The increasing importance of VPH activities involves new biotechnologies, urbanisation, control of “hidden infections”, new agricultural practices and ethical questions associated with these developments.

4. The participation of veterinarians in multisectoral and multidisciplinary systems, both private and official, calls for a new understanding of the objectives and role of VPH within an overall management strategy of professional coherence.

**LES PERSPECTIVES DE LA SANTÉ PUBLIQUE VÉTÉRINAIRE : ESTIMATIONS DES TENDANCES ET RECOMMANDATIONS. – K. Bögel.**

__Résumé:__ Dans un monde de plus en plus peuplé où émergent de nouveaux schémas d'exploitation des terres et de nouvelles biotechnologies, on assistera à l'épanouissement d'une médecine vétérinaire des populations qui s'inscrira dans la triade de la santé : «Environnement – Animaux – Hommes». Cette orientation devrait s'accompagner d'une expansion considérable des pratiques de santé publique vétérinaire et d'une mutation profonde de l'enseignement vétérinaire, avec prédominance d'approches interdisciplinaires et multifocales. Il sera essentiel d'atteindre un haut niveau de spécialisation tout en assurant
une intégration par rapport aux principaux objectifs de la triade de la santé. 
La gestion de l'intégration influera aussi sur la cohérence de la profession vétérinaire en matière de recherche et de formation.

Les principaux problèmes de la santé publique vétérinaire concernent les nouvelles biotechnologies, l'urbanisation (notamment dans les pays en développement), la prophylaxie des «infections cachées» entrant dans la chaîne alimentaire, les nouvelles pratiques agricoles ainsi que les questions éthiques correspondantes.

MOTS-CLÉS : Formation vétérinaire - Organisations internationales - Santé publique - Services vétérinaires.


Resumen: En un mundo cada vez más poblado, que recurre a nuevos sistemas de explotación del suelo y a nuevas biotecnologías, el desarrollo de una medicina veterinaria poblacional dentro de la tríada sanitaria formada por el medio ambiente, el animal y el hombre, tendrá cada vez mayor importancia. Esta orientación debería ir acompañada de una importante expansión de las normas de salud pública veterinaria y de una profunda modificación de la formación veterinaria, más centrada en la interdisciplinaridad bajo liderazgo multifocal. Será primordial alcanzar un alto nivel de especialización y lograr simultáneamente la integración con relación a los principales objetivos de la tríada sanitaria. De la gestión de la integración dependerá también la coherencia de la profesión veterinaria en materia de investigación y enseñanza.

Los principales problemas en materia de salud pública veterinaria son las nuevas biotecnologías, la urbanización (particularmente en los países en desarrollo), el control de las «infecciones ocultas» infiltradas en la cadena alimentaria, los nuevos sistemas de explotación agraria y las cuestiones éticas asociadas a estos problemas.

PALABRAS CLAVE: Formación veterinaria - Organizaciones internacionales - Salud pública - Servicios veterinarios.

Appendix I

SUPPLEMENTARY WHO PUBLICATIONS AND DOCUMENTS CONTRIBUTING TO THE REORIENTATION OF VETERINARY EDUCATION

VPH guidelines (1980-1991)


WHO meeting reports (1988-1991)


WHO/CDS/VPH/90.87 Report of WHO consultation on research on new slaughter technologies to reduce cross-contamination, Roskilde, Denmark, 2/1990.


WHO/Rab/Res./88.27 Simplified technique for the collection, storage and shipment of brain specimens for rabies diagnosis.

WHO/Rab/Res./88.28 Potency and stability of various modern rabies vaccines for veterinary use.

WHO/Rab/Res./88.29 Trousse de diagnostic immuno-enzymatique rapide de la rage.

WHO/Rabies/89.199 Principles for public education and cooperation in dog rabies control.


WHO/Rabies/90.201 Corr. 1 Instructions relatives à la conception, à l’équipement et à la dotation en personnel, d’une unité de production de vaccin antirabique à usage vétérinaire.

SUMMARY OF RECOMMENDED FUTURE DIRECTIONS FOR VETERINARY MEDICINE
From the Pew Report (14)

1. Change the focus of the veterinary medical profession from animal disease to animal health in all its dimensions.

2. Abandon the unrealistic concept of the universal veterinarian who can minister to the health needs of all creatures great and small.

3. Restructure veterinary practice to better serve the needs of society and the veterinary profession in the future.

4. Make research a higher priority for individual veterinarians, the veterinary medical profession, and for veterinary medical colleges.

5. Establish a more rational system of funding for veterinary medical research.

6. Improve the quality of veterinary services delivered to all species of animals in response to the escalating expectations of the public as to the health care of all of the animals important to people.

7. Strengthen the general education of veterinarians.

8. Focus the professional education process and the practice of veterinary medicine on the ability to find and use information rather than the accumulation of facts.

9. Strengthen the basic biological science content of the veterinary medical curriculum.

10. Make the achievement of educational, experiential, and cultural, racial and ethnic diversity among veterinarians a goal of veterinary education.

11. Reorient clinical veterinary education to enable a student to elect in-depth instruction and clinical experience with a practice theme (class of animals or a single species), rather than require all students to obtain clinical experience with numerous species.

12. Change the emphasis in the veterinary curriculum from almost total concentration on clinical practice to include important public sector needs for veterinarians.

13. Move towards a national perspective or strategy of veterinary medical education.
Appendix III

CONTENT AND INTENSITY OF TRAINING IN VETERINARY EPIDEMIOLOGY ACCORDING TO PROFESSIONAL ENGAGEMENT

From a WHO report (27)

<table>
<thead>
<tr>
<th>Veterinary levels</th>
<th>Veterinary schools (undergraduate)</th>
<th>Population medicine/ herd health practice</th>
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* DVO: District Veterinary Officer
** e.g. reservoir ecology, herd immunology, means of transmission, vectors, tenacity of agent, pathogenesis, etc.

E: Elementary
I: Intermediate
A: Advanced
REFERENCES


