

SIGNIFICANCE OF VETERINARY PUBLIC HEALTH

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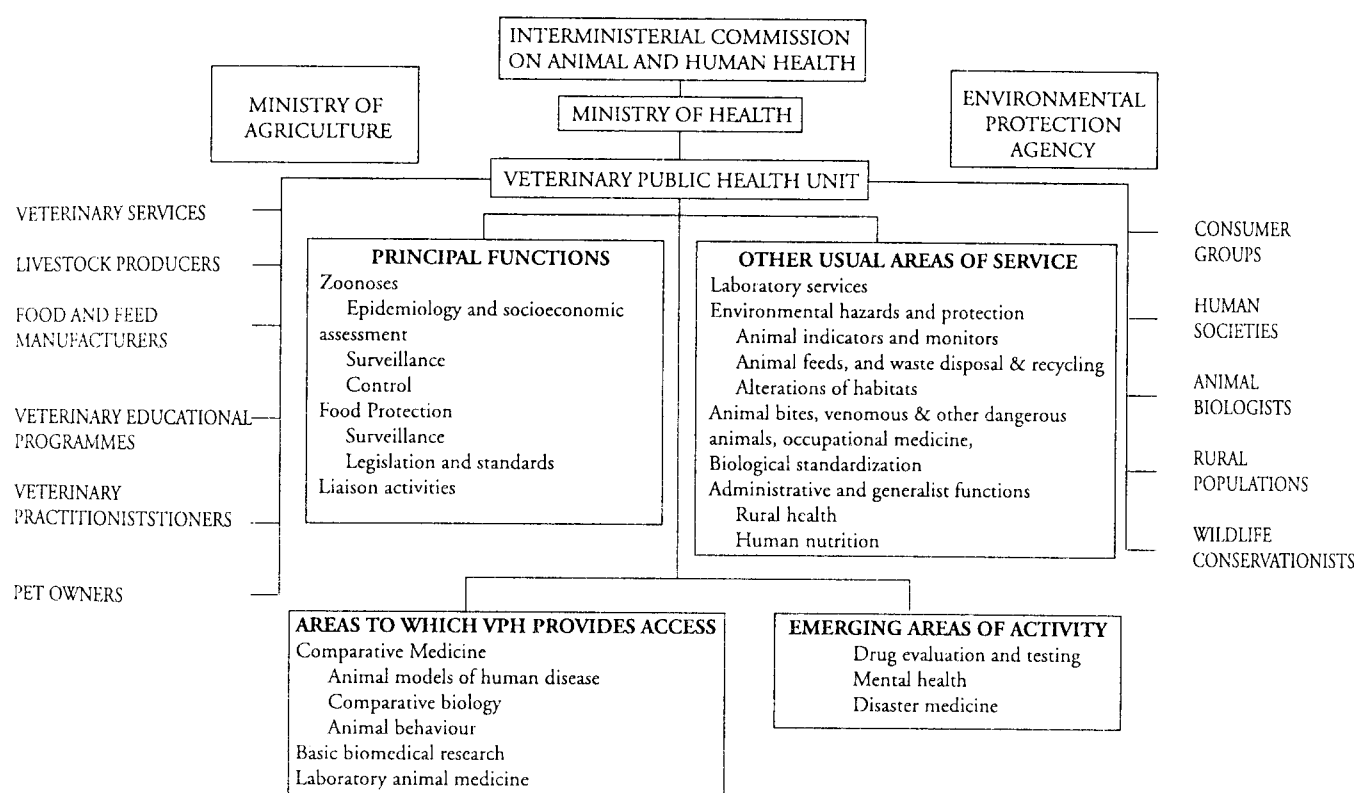
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Veterinary practice is undoubtedly as old as the domestication of animals and existed from at least 2000 BC. The first written record (1800 BC) of veterinary medicine from Egypt is provided by the Kahun Veterinary Papyrus, which discusses the diagnosis and treatment of diseases of domestic animals and fish. Similarly in ancient India, the Hindu scriptures, which were collected from about 1800 BC showed

considered inauspicious and prospective site was considered unhealthy. Aristotle indicated the knowledge of sharing of infection between man and animals in case of rabies and plague. Rudolf Virchow rightly remarked, "Between animal and human medicine there is no dividing line nor should there be. The object is different but the experience obtained constitutes the basis of all medicine."

Flow chart: - FUNCTIONS AND LIAISON RELATIONSHIPS OF A VETERINARY PUBLIC HEALTH UNIT



that veterinary practice had reached a high level of development by that time. However, examples drawn from most periods of veterinary history confirm the close natural relationships of veterinary medicine and its practice to the public's health. If the translation of the Babylonian Code of Eshnunna is correct, the veterinarians of 2000 BC, who dehorned oxen because they were dangerous to the public were already practicing public health veterinary medicine. The architect Vitruvius Palio wrote that even in his day (ca.100 BC), Roman citizens preparing to select a new town site used to kill animals that had grazed upon the land in order to examine their livers and discoloured livers were

In 1975, a Joint FAO/WHO Expert Committee on Veterinary Public Health defined Veterinary Public Health (VPH) as "a component of public health activities devoted to the application of professional veterinary skills, knowledge and resources to the protection and improvement of human health". As the VPH activities must be carried out in close partnership with other public health efforts to ensure positive health outcomes, the study group redefined VPH as "the sum of all contributions to the physical, mental and social well being of humans, through an understanding and application of Veterinary Science."

In many parts of the world, Veterinarians, because of their knowledge of animal diseases as well as their ecological, economic and human cultural contexts have become leaders in developing and implementing new methods of promoting sustainable public health which are ecosystemically grounded, culturally feasible and economically realistic.

Current functions of Veterinarians in Public Health

The functions and liaison relationship of a Veterinary Public Health Unit is cited in the flow chart.

Principal functions:

Food protection:

It is one of the highest priority areas for initiation of veterinary public health services. In spite of continuing advances in the field of food protection, the number and frequency of food borne diseases is now increasing alarmingly with incidence of bacterial diseases caused by *E. coli* 0157, salmonellosis, listeriosis, *Vibrio parahaemolyticus* infection etc. In some parts of the world helminthic and protozoal parasites are even more important food borne hazard. Toxic metabolites produced by fungi have been discovered in recent years to cause chronic intoxication in man and animals.

VPH leadership is essential especially in protection of foods of animal origin viz., meat, milk, egg and fish, to respond to the threat posed by these food-borne diseases particularly in the development of sustainable, integrated safety measures for the reduction of health risks along the entire food chain. Promotion of animal health is the key for enhancing quality and quantity of animal products. In all countries, improved animal health and quality assurance (farm-to-table approach) contributed to food security at local and national levels. To achieve this, antemortem and postmortem inspection of food animals is of paramount importance.

In India, inspection of animals is mainly carried out only in a few organized slaughter houses and processing plants. In Kerala, the slaughterhouses are functional under the Health Departments, at Corporation level. Moreover, only a few veterinarians are posted, who are involved in meat inspection and certification. The inadequate posting of the veterinarians at the available posts and the non-involvement of the Veterinarians in the inspection activity at municipal and block level animal slaughter reveals the neglect of the government in this otherwise lucrative sector. This negligence has led to the rejection of meat and its products at international level, due to the inability to meet the standards prescribed by different international agencies. The public health Veterinarians should be involved by the government in the inspection of food animals, in order to tap the meat production and export potential of the State.

Added to these changing patterns of biological hazards associated with foods is the increased presence of dangerous additives, pesticide residues, antibiotic and artificial hormone

residues and heavy metals. The widespread use of antimicrobials in food producing animals, for treatment, prophylaxis and growth promotion, has led to the development of drug resistant bacteria, which may be transmitted to humans through food supply. VPH leadership is therefore essential to evaluate and respond to the human health consequences of using antimicrobials and other chemical substances in foods of animal origin.

A major difficulty encountered in carrying out food control programmes in some countries is the lack of adequate legislation. This problem becomes increasingly important with respect to international trade in foods, and creates difficulties to both importing and exporting countries. There should also be an incorporation of internationally accepted food standards into national regulations, which will favour the development of well-organized and comprehensive local food control system. The main purpose of food quality standards is to protect the health of consumers and to ensure fair practice in trade. For these purposes, most countries participated in the Joint FAO/WHO Food Standards Programme to produce a "Codex Alimentarius". This programme, in which there has been active VPH participation, has contributed standards for the composition of foods, recommended international tolerances for pesticides, and maximum levels for a number of food contaminants and food additives. Similar problems exist nationally in many countries and this is an area in which VPH services are in a position to give advice, as well as to initiate legislative action.

2. Zoonoses

The WHO expert committee on zoonoses at its third meeting in 1966 defined Zoonoses as "those infections, which are naturally transmitted between vertebrate animals and man". At least one half of the 1700 agents known to infect humans have an animal or insect vector reservoir and many emerging infections either are or appear to be zoonotic. Although zoonoses have been said to comprise the most significant group of communicable diseases, they are a biologically heterogeneous group of infections and infestations. A mutual concern for the zoonoses furnishes an opportunity for profitable communication between the physicians, veterinarians and other biologists. VPH expertise is an essential component of public health response to emerging and re-emerging infectious diseases.

Among those zoonoses recognized today as particularly important are anthrax, brucellosis, bovine tuberculosis, leptospirosis, salmonellosis, spotted fevers caused by rickettsiae, rabies, several of the more common arthropod-borne viral infections and certain parasitic diseases especially cysticercosis, hydatid disease, etc. In addition, several diseases common to animals and man caused by organisms living saprophytically in certain environments are also of interest to both physicians and veterinarians. They are mainly fungal diseases such as histoplasmosis, coccidioidomycosis, rhinosporidiosis and blastomycosis, but also include bacterial diseases such as tetanus,

meliodiosis, listeriosis etc. New human diseases can also arise from unsuspected animal reservoirs recently, pandemic strains of influenza, which emerged from reservoirs in birds or pigs. Environmental and ecological changes can also have profound effects on the rate of appearance of vector borne and zoonotic diseases. Some important zoonotic diseases are listed below.

LIST OF SOME IMPORTANT ZOOTIC DISEASES

BACTERIAL INFECTIONS

- | | |
|---------------------------------|------------------|
| - Brucellosis | - Salmonellosis |
| - Shigellosis | - Yersiniosis |
| - Tuberculosis | - Vibriosis |
| - Listeriosis | - Leptospirosis |
| - Borreliosis | - Lyme disease |
| - Campylobacteriosis | - Colibacillosis |
| - Staphylococcal food poisoning | - Anthrax |
| - Dermatophilosis | - Melioidosis |
| - Glanders | - Tularemia |
| - Streptococcosis | - Capnocytophaga |
| - Plague | - Brucellosis |
| - Cat scratch disease | |

RICKETTSIAL DISEASES

- | | |
|-----------------|--------------------------------|
| - Psittacosis | - Rocky mountain spotted fever |
| - Murine typhus | - Q Fever |

VIRAL INFECTIONS

- | | |
|--------------------------|---------------------------------|
| - Rabies | - Arthropod borne arboviruses: |
| - St. Louis encephalitis | - Hantavirus pulmonary syndrome |
| - Cowpox | - Herpes infection |
| - Yellow fever | - Monkey pox |
| - Influenza | - FMD |

FUNGAL INFECTIONS

- | | |
|------------------|------------------|
| - Blastomycosis | - Dermatomycoses |
| - Cryptococcosis | - Histoplasmosis |
| - Sporotrichosis | |

PARASITIC INFECTION

- | | |
|-----------------------|--------------------------------------|
| - Hydatidosis | - Cysticercosis |
| - Trichenellosis | - Sarcocystosis |
| - Toxoplasmosis | - Cryptosporidiosis |
| - Diphyllorhynchiasis | - Cutaneous & Visceral larva migrans |
| - Dracunculiosis | - Schistosomiasis |

Historically, in the field of zoonoses, the public health veterinarian had been most recognized for his responsibilities in canine rabies control, which in almost all countries is under the jurisdiction of the public health authority. Although rabies control has often led to the initiation of veterinary public health programmes, as has food protection, it is clear from the foregoing classification of zoonoses that the public health veterinarian's role is a much wider one in this sphere, embracing work that may fall under the responsibility of either agricultural or public health authorities, or both.

Hence, the initiation of a programme of zoonoses control based upon socio economic priorities requires quantitative

morbidity and mortality data for both man and animals. Other steps in the development of programmes for the control of zoonoses are epidemiological studies that involve the investigation of geographical areas or populations with specially high and low frequencies of infection for the formulation of hypothesis concerning the determinants of high levels of infection and to subject these hypotheses to quantitative analysis. Responsibility for such activities constitutes the principal role of many public health veterinarians.

It is clear that programmes for the control of zoonoses require the collaboration of experts from a number of different disciplines. This collaboration should be provided at all stages of the programme - planning, execution, and evaluation. All public health veterinarians should constantly explore new aspects of the relevance of veterinary medicine to human health and in their liaison capacity should promote programmes for execution by an appropriate agency or by multiple agencies. With respect to zoonoses control, and generally, the public health veterinarian thus acts as a link between the governmental agencies in which veterinary professional skills are deployed.

Other services performed by veterinary public Health

a) Environmental hazards and protection

Veterinary public health is actively concerned with a number of components of environmental protection and in the future, this can be expected to become a much more important VPH function. Increasing attention has been paid in recent years to animals as indicators of environmental hazards other than microbiological hazards. Animals share man's environment and can act as indicators of the presence of undesirable materials in the environment, following ingestion of these materials and by other mechanisms. Identification of high mercury levels in the organs of Japanese cats showing nervous signs directed attention to the cause of a similar disease in fish eating people inhabiting in the same areas of Japan's Minamata bay. The decline in sea bird population associated with their eggshell fragility apparently induced by DDT is another example of the probable effects of the agent on human beings. Certain animal species are more prone to accumulate particular chemical substances and can therefore be selected as unusually useful detectors of toxic substances. When unexpected patterns of morbidity or mortality occur in animal population, investigation by public health veterinarians and other specialists is indicated, since no prior assumptions can be made about the possible nature of the etiological agent or the pre disposing factors. Failure to heed such warnings of health risks may later be a cause of great regret.

The second area of VPH concern in environmental health has arisen in connection with the problem of disposal of animal wastes and waste products from animal industries. Both have become more abundant as animal population numbers and densities have increased in rural and urban areas. Related hazards are being encountered as the result of efforts to dispose

off human and animal waste without adverse environmental consequences, particularly in attempts to utilize their residual energy and nutrient value as feeds. The need for promoting faster growth and production in the recent past had led to the utilization of animal wastes - organs and parts of animals considered not fit for human consumption, for producing protein supplements (meat and bone meal) through various heat and chemical treatments. Ecologically, however, this had created ideal conditions for the spread and enhancement of food borne illness. Well before the epidemic of bovine spongiform encephalopathy (BSE) in Britain, salmonellosis was known to increase and be magnified throughout the food system through these synergistic effects. The BSE epidemic not only clarified the weakness in the organization of agricultural sector but also uncovered some structural problems in the relationship between veterinary and human public health, which led to the loss of lives due to CJD.

b) Disaster Management

Natural disasters (such as, storms, flood, tidal waves, earthquakes, volcanic eruptions) and manmade disasters (viz., wars, industrial and nuclear disasters) usually call for considerable VPH support. The immediate actions include ensuring the provision of safe food of animal origin, arranging for the care or slaughter of injured animals, arranging for the collection and care of animals out of contact with their owners, controlling animal disease outbreaks and assisting in the selection of refugee camps. The further action in disaster management includes restoring, slaughtering, meat inspection, milk collection, processing and storage, controlling vectors and reservoirs of zoonoses and other animal pathogens and reinstating epidemiological surveillance including the use of animals to monitor health risks.

c) Laboratory services

Health laboratory services are essential to the successful performance of epidemiological studies, surveillance of zoonoses and to food protection activities. General veterinary participation in health laboratory services is now indispensable, since, specimens are submitted from human as well as a wide range of animal sources and the laboratories involved must be familiar with the difference in techniques and interpretations dictated by species differences.

In some countries veterinarians have helped to found public health laboratories and today some directors of public health laboratories are scientists whose basic training was in veterinary medicine. In some countries, food hygiene laboratories in their broadest sense (not merely milk and meat) are also under veterinary control and may be external to the public health infrastructure. In contrast, in a few countries, laboratories dealing with animal disease control are found under the public health administration. The field of health laboratory services is rapidly becoming a more important area for veterinary public health participation.

d) Health aspects and control of biting, venomous, toxic and other dangerous animals

1. Animal bites and other injuries:

A large variety of mammals and other animals, both domesticated and wild, inflict injuries on man of varying severity with their teeth, claws, horns, hoofs, spines, etc. Almost exclusively occupational groups, whose work brings them in contact with the animals concerned, suffer many of these injuries. For example, shark bites in sea divers; mauling by bears and other carnivores in forest workers; kicks, goring injuries and bites in farmers, animals attendants and their families, and injuries to veterinarians.

A large proportion of reported dog bites result in laceration and contusions, some requiring suturing or other surgical treatment including plastic surgery. Psychological trauma in the form of fear, including fear of rabies, is generally intense. Community panic has resulted from known instances of children being attacked and killed by packs of stray dogs.

Rat bites also constitute a worldwide problem, although this problem is considered to be of lesser magnitude than that of dog bites. Most rat-bite victims are attacked while asleep (usually in the early hours of the morning) and the limbs are bitten more often than other parts of body. Few epidemiological studies of this problem have been undertaken, despite the known prevalence of rat-bite injuries to babies, particularly in urban slums. Apart from bite injuries, rats also cause pollution of food with their urine and faeces, transmit diseases, and cause heavy losses through spoilage of grains and other dead materials.

Other animal bites of public health importance include those inflicted by wild animals kept as pets, among which monkey bites are important, particularly for their traumatic consequences and for transmission of very dangerous herpes virus infection. Cat bites and scratches may be severe and have been implicated in transmission of rabies, pasteurellosis and cat-scratch disease.

Thus animal bites constitute a significant problem and, as a study and prevention should receive adequate public health attention and should be an important component of veterinary public health.

2) Venomous and Toxic animals

Many animal species produce or store toxic substances for physiological purposes, for defence, or for paralyzing their prey. The factors leading to the high death rates that result from snake bite are poorly understood; for example, some areas of the Ganges delta in India and Bangladesh show a much higher snake-bite death rate than apparently similar neighboring areas in the Brahmaputra delta.

Public health veterinary services might well supervise the general problem while local veterinarians, as a result of their presence in rural areas and their medical and zoological background, are well suited to organize local preventive measures.

and to deal with emergencies.

e) Comparative medicine :

Comparative medicine can be defined as the study, by analogy, of phenomena of health and disease in different animal species, including man. This approach to research derives from the axiom of "one medicine" and the belief that although the human and veterinary practice are different, links between them have been most fruitful and need to be constantly cultivated.

The relationship between the public health veterinarian and comparative medical research lies essentially in the liaison role of the former: it is his role to bring to the attention of health workers all veterinary information that could be of use in advancing human health. This can be done through the distribution of literature and reports, the organization of meetings and conferences; the co-ordination of nomenclature, as well as through the promotion of specific research projects. Sources of comparative medical information include that acquired from veterinary practitioners working in government clinical centers, private veterinary hospitals, pathology services, zoological gardens, laboratory animal colonies, and wildlife services etc., as well as from veterinary schools, research centers, and specialized units concerned particularly with development of laboratory animal models. A part of comparative medical research that might well be included in the programme of a veterinary public health unit is that concerned with comparative epidemiological studies on diseases of unknown etiology.

f) Laboratory animal production and medicine

Laboratory animal science is a multidisciplinary field in which the role of the Veterinarian is increasing in importance, not only because of the growing number of animal species required, but because of increasingly varied requirements, for

example, for gnotobiotic animals, animals grown on deficient diets, animals submitted to surgical treatments and such other programmes intended for the improvement and productivity of animals and the protection of human health.

The production and testing of biological materials, the performance of medical diagnostic tests and biomedical research using animals all require animals raised under stringent conditions in order to eliminate as many biological variables as possible and to identify those variables that cannot be eliminated. The reactive capacities of an animal depend on the interplay of hereditary and environmental factors. In order to achieve maximum standardization (i.e. maximum reproducibility of the results of animal experiments) integrated control over both groups of factors is necessary.

Hence, with the increase in the incidence of food borne outbreaks associated with foods of animal origin, it is essential for the public health veterinarian to control diseases in animals and also to implement a quality assurance programme from the farm to consumer level. The emergence and re-emergence of zoonotic diseases in the recent past also requires a systematic surveillance and evaluation of disease control programmes. With the ever increasing occurrence of environmental health problems pertaining to chemical residues, animal wastes etc., it is essential to increase veterinary participation in controlling them. As the global public health movement matures, one can hope that veterinary and non veterinary public health practitioners can be more openly integrated into new organizational vehicles to take advantage of their complementary and synergistic understandings of what it means to create healthy and sustainable human communities on earth.



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heat, turning the bars and basting with vegetable oil from time to time till doneness with golden brown colour is obtained.

In shami kababs, meat chunk and soaked black gram are simmered in water for 15 min before grinding. It is seasoned with salt, spices and condiments. Egg can be added to the mix according to preference. It is moulded into round cakes and shallow fried.

Chicken Kofta: Meat from culled and spent chicken can be used. Lean meat is coarse ground and mixed with 10-15% vegetable oil, plain flour, egg, condiments, spices and salt. The batter is rolled into small balls and deep fat fried for 5 min. The are packed in pouches and can be store at 40C for a week.

Chicken Tikka: Minced chicken is pressure cooked for 2 min. Mix 40% cooked, minced chicken, with 60% raw minced chicken. This chicken mixture is thoroughly mixed with mashed potato rice flour, breadcrumbs or rusk, salt, spices and condiments in a mixer. This blended batter is made into 70 g

tikkas and low fat fried to an internal temperature of 700C. It is consumed hot.

Restructured Meat Products

Less desire carcass cuts, meat trimmings and meat comparatively high in connective tissue can be used in the preparation of steaks, roasts, chops, rolls, nuggets, sticks, etc.,. Sinews and excess fat trimmed off and subjected to any one of the following three processing techniques depending on the desired appearance and texture:

1) Chunking and forming, 2) flaking and forming and 3) sectioning and forming.

Several other minced/cured/ smoked/ dried/ restructured meat products are also in demand. They can be manufactured depending on the consumer preference in a particular area observing HACCP and GMP principles.

