

The challenges for surveillance and control of zoonotic diseases in urban areas

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Summary. The world is rapidly changing in many aspects concerning veterinary medicine, and man-animal relationships in urban areas represents a real challenge for the profession. Unlike the vertical approach of the academic teaching tradition, veterinary urban hygiene needs a strong holistic-epidemiologic support. Year by year, new animals, new animal uses, new fashions, new zoonoses, and new problems appeared amplified by media with the duty of the public veterinary services to solve them. The practical experience of many years of these continuous challenges is now concentrated on a new health sector: urban veterinary hygiene that now calls for a multidisciplinary and intersectoral collaboration with other professional categories to guarantee human, animal and environment health.

Key words: veterinary urban hygiene, zoonoses, veterinary public health.

Riassunto (*Sorveglianza e controllo delle zoonosi in aree urbane*). Nel mondo molti aspetti riguardanti la medicina veterinaria vanno rapidamente mutando, ed i rapporti fra uomo ed animali in ambiente urbano rappresentano una vera sfida alla professione. In luogo dell'approccio verticale della tradizione educativa accademica, l'igiene urbana veterinaria necessita di una precisa visione olistica degli eventi epidemiologici. Anno dopo anno stanno emergendo animali nuovi, nuovi impieghi degli animali, mode, zoonosi ed altri problemi che, amplificati ad opera dei mass media, aspettano soluzione da parte dei servizi pubblici veterinari. L'esperienza pratica pluriennale in questi nuovi campi di sfida è ora incentrata su un nuovo settore della sanità, l'igiene urbana veterinaria, che richiede oggi una collaborazione multidisciplinare ed intersettoriale con altre categorie professionali al fine di garantire la salute dell'uomo, degli animali e dell'ambiente.

Parole chiave: igiene urbana veterinaria, zoonosi, sanità pubblica veterinaria.

THE BIRTH OF VETERINARY URBAN HYGIENE

The cultural revolution in zoonoses approach marked by the birth of veterinary urban hygiene (VUH) is already 28 years old and has reached full maturity. VUH is a new science, but the governors' interest in the presence of animals in cities is well documented also in the past when, during pestilences, they were considered plague spreaders. However, from a historical point of view, the official birth of VUH is considered to be the WHO Expert consultation on some veterinary public health problems [1]. VUH is now defined as the activity dealing with those health aspects associated with human-animal-environment relationships in urban areas [2]. The first step was represented by the classification of urban areas (a concept which is however largely varying in the different countries), and of the environments and the categories of animals they harbour; in this phase, the ecological approach was relevant as the holistic one. According to the WHO [1], the main types of urban situations may be classified into: a) urban situation; b) suburban situation; c) semi-urban situation. The

differences among these types of urban conditions are not clear-cut and the various kinds of metropolitan structures need to be described. The urban situation is an entirely built-up area in cities and towns. This is sometimes characterised by the absence of true green areas or by their dispersion among buildings with scarce access to one another. The suburban situation consists of the outskirts of cities and towns with access to house gardens, public parks and to countryside. The semi-urban situation is peculiar to small towns or villages with access to open land and involvement of farm animals. In some areas of the world the inhabitants live in urban territories which are not only extremely huge but extend far beyond the borders of the individual metropolitan areas. A good example of a megalopolis is represented by the Po Valley where a permanent population of several millions of individuals live together with enormous concentrations of domestic, synanthropic and wild animals, without any real interruption of the urban situation. Animals inhabiting urban areas may be schematically divided into four categories: companion animals (pets), synanthropic animals, food-pro-

ducing animals and wild animals. Companion animals that share the urban environment with man are kept for company or for aesthetic reasons or leisure. This category may play an important role in the epidemiology of some zoonoses occurring in urban areas. Companion animals include many species, and cats and dogs represent the most popular pets living in close contact with man and with other domestic and synanthropic animals. Uncontrolled and ownerless dogs and cats are now recognised as a serious hazard in many areas, and in several towns they breed freely outside human dwellings. Other pets kept in urban areas are some rodents or lagomorphs and many wild species including various rodents of attractive appearance and also some species of carnivores, monkeys, snakes and arthropods. Another important group of pets is birds (mainly parrots), canaries, doves and jackdaws. Many peoples are not aware of the health risks linked to close contacts with these companion animals. Synanthropic animals are species which regularly inhabit human settlements, where they form permanent or temporary, independent or semi-independent populations. Various species of small mammals and their ectoparasites affect the epidemiological characteristic of certain diseases in urban areas where they invade the houses and adapt themselves to the new environment. Since they represent important carriers of zoonoses, they are a serious danger to human health and pose control problems. Pigeons and other free-living birds inhabiting city parks and gardens are considered by the people as pleasant animals, but they also present zoonotic hazards and may be a source of blood-sucking ectoparasites, cause allergies, and may transmit ornithosis and arboviruses. In many places, domestic food-producing animals are still kept in urban, suburban and semi-urban areas although in industrialised countries this is a rare occurrence. Contacts with the above animals categories may result in health risks for humans and favour disease circulation. The natural or man-made habitats of suburban areas in different regions of the world also harbour wild animals which may be a component of natural *foci* of zoonoses. These *foci* may be present in the vicinity of or in the suburban estates themselves. The migration and movements of wild mammals and birds may imply serious epidemiological risks. Subsequently, different zoonoses were identified according to their epidemiological patterns, *i.e.* zoonoses with an urban cycle (able to perpetuate itself indefinitely in the urban environment); zoonoses derived from environmental "animalisation" (the enrichment of soil or water with animal materials, such as hairs, skin scales, crusts, faeces, etc., which transform the soil and/or water into a cultural medium suitable for the growth of pathogens); zoonoses transferable from the rural to the urban habitat and *vice versa* and, finally, imported zoonoses [3]. A strong network of technical support was established to monitor the evolution of those problems that over the last decades were

brought to the attention of Veterinary Public Health in urban areas.

THE MATURITY

The evidence of maturity came with the most recent definition of VUH that reads "The complex of activities of veterinary competence able to promote human health in the urban environment". Here, the term "health" is not described as the mere absence of disease, but is given a positive meaning as "a state of complete physical, mental and social well-being". Both definitions are synergistically summarised in the concept of zoonoses which are now considered not only diseases naturally transmitted from animals to man but as "any detriment to the health and/or quality of human life deriving from relationships with (other) vertebrate animals or edible or toxic invertebrates" [4]. The interpretation of the new concept is both enlightening and revolutionary in that zoonoses are now embracing all problems (whose seriousness depends on the sensibility of communities and individuals) associated, in this context, with the presence of animals in the urban environment. Actually, a definition so seemingly far from the original concept stresses a series of tasks and activities that over the last three decades have been accumulating all over the world identifying new responsibilities of public veterinary action in urban territories. It can be affirmed that VUH reached its maturity with the transition from biological risks to problems. This means that instead of speaking of dermatomycoses, leishmaniosis, toxocariasis (still representing major zoonoses with an urban cycle), such issues were tackled as animal populations management in towns, faecal pollution of the environment, cat and dog straying/vagrancy. These are all problems whose impact in term of pathologies is less than the nuisance caused by the situation itself and magnified by the media.

THE CHALLENGES

The increasing power of the media is certainly another challenge to veterinary services which are usually scarcely prepared to show full transparency in their activities, as required by global communication. These communication problems affecting the veterinary profession are further compounded by sensationalism and by poor preparation sometimes produced by the media as a sort of "jam" purposely spread over a public that has by now become aware and culturally capable of correctly understanding even distorted information. In the absence of official communication structures and of a specific task force, this trend appears hard to counteract, and the problem is exacerbated by the poor visibility of veterinary activities in general and of the social service they provide. With some differences, these problems involve all countries and their magnitude depends upon the efficiency of veterinary services

(which is in turn linked to the resources invested in the health sector). A dramatic rise in the stray dog population with resulting attacks to persons and the reappearance of urban rabies were opposed by the increased sensibility of the public to animal well-being and, as a result, by their reluctance to accept drastic measures of dog population control. Old problems (rabies, dog straying) are counteracted by a new feeling (animal-rights movement) that better profits from a globalised pietism spread by the media; some Italian TV programmes were broadcast in this very sense originating a paralysing chain of animal-lovers' solidarity. The result was a waste of resources in neutering campaigns not supported by eco-epidemiological data enabling this intervention to be properly planned and evaluated. The concept itself of euthanasia, that has always existed as an instrument of veterinary profession [5], now meets with strong opposition even on veterinarians' part whereas its extension to human beings is winning increasing favour as a precondition for its liberalisation in the near future.

MAN/ANIMALS RELATIONSHIPS

Along with a greater attention to the welfare of animals, the tendency has grown to transform them into objects whose possession does not represent a complement to affection but an instrument of social prestige. From the secularisation of animality, an antithesis ("animal" shares the same root with the Latin word "*anima*" - soul), the phenomenon stems of keeping exotic pets, with health consequences (fatal encephalitis in children following infection with raccoon ascarids; [6]), larger and larger and, most of all, aggressive canine breeds responsible for dog bites emergencies, of abandonment, and of dog pounds. Also the problems associated with the management of dog pounds are so far from being solved that to date not even a minimum level of well-being has been established by the veterinary service for the captive animals in these (public and private) structures. Similar problems are encountered in animal trade, pet shops, impoverishment of planetary resources with risk of extinction of some species (parrots) and introduction of exotic pathologies also through aquarium plants (mycobacteriosis, schistosomiasis).

Following the elimination of many custom barriers, the frequent movements of our animals call for strict control and reliable certifications [7]. In Italy alone, starting from 1980, leishmaniosis, thanks also to the coming and going of dogs from southern endemic *foci*, has already become endemic in the whole country including some (ecologically) unsuspected Alpine areas [8]. In addition, the epochal migrations experienced by industrialised countries have introduced food habits, customs and traditions leading to the re-emergence of typically rural zoonoses in urban districts; indeed, foci of cystic echinococcosis and taeniasis in the USA were ascribed to

settlements of Hispanics coming with their animals from the southern areas of the continent [9].

NEW ANIMAL UTILITIES

Also the use of animals has changed: from pet therapy to psychological support in prisons and hospitals, from education in schools to the employment of animals in civil defence. Each of these tasks commands different, stringent health standards as well as aptitude evaluation of the man-animal relationship. In this context, some valuable help can be provided by behavioural medicine, a novel specialised branch of veterinary activity [10].

In addition, the already conspicuous presence of immunodepressed and transplanted people (a case of rabies associated with transplant was recently reported in Germany) requires special *ad hoc* standards for evaluating animal health in view of zoonotic risks [11] now including some saprophytic agents.

INTERSECTORAL COLLABORATIONS

Besides a wider worldwide circulation of contributions and VUH experiences, the challenge faced in the 3rd millennium by this new branch of public veterinary activity is willingness to co-operate with other professional categories.

Physicians and biologists, as health care providers, are certainly the culturally more allied figures; the former, with their data bank on human health, may give invaluable contributions to the management of animal-associated problems and, at the same time, benefit from data on animal pathology they may use, for instance, for assessing risks of exposure to certain carcinogenic agents. Biologists have become indispensable in ecological evaluations needed to manage synanthropic animal populations, occasionally including urbanised wild species [12, 13]. Conceptually more distant is collaboration with engineers, architects and town planners, categories able to work out building solutions for cities and dwellings to make them also suitable for animals. Some few relevant examples are green areas, public and household toilets for dogs and cats, automatic systems of faeces disposal, synanthropic animal-proof buildings.

Also wealthy countries are gradually agreeing to limit the exploitation of available resources [14]. In view of this trend, the evaluation of the efficacy and efficiency of interventions proposed by VUH needs the collaboration of economists in order to correctly elaborate cost/benefit analyses [15].

A safe man-animal coexistence is now an integral part of modern society and its attainment calls for a strong commitment of public veterinary services not only in terms of economic resources, but also of intellectual, imaginative and inventive skills for the realisation and control of means and instruments of health management in the broadest sense of the term.

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References

1. Bellani L, Mantovani A, Ravaioli L. (Ed.) Proceedings of the WHO Expert consultation on some veterinary public health problem. Roma, 8-12 December 1977. *Ann Ist Super Sanità* 1978;14:I-IV.
2. Mantovani A. In: Lasagna E (Ed.). *Public health aspects of human-animal interaction in urban areas in developing countries, with particular attention to zoonoses*. San Marino: Il Titano; 1998. p. 23-38.
3. Mantovani, A. Igiene urbana veterinaria. In: *Iniziativa zooprofilattiche e zootechniche Atti della giornata di studio su: zoonosi ed animali da compagnia*. Brescia, 27 maggio 1983. Brescia: Camusa; 1983. p. 115-60.
4. Mantovani A. Notes on the development of the concept of zoonoses. *Hist Med Vet* 2001;26:41-52.
5. Fasano A. Eutanasia, una scelta difficile. *Progr Vet* 2002;11:585-6.
6. Kimball V, Young D, Keit R, Kazakos K, Sakanari J. The occurrence of *Baylisascaris procyonis* in three North bay counties in California. In: *10th International Congress of Parasitology*. ICOPA X, 4-9 August 2002, Vancouver: World Federation of Parasitologists; 2003. p. 313.
7. Sella G, Sinna D. Movimentazione di cani, gatti e furetti. *Progr Vet* 2005;60:54-61.
8. Capelli G, Baldelli R, Ferroglio E, Genchi G, Gradoni L, Gramiccia M, Maroli M, Mortarino M, Pietrobelli M, Rossi L, Ruggiero M. Monitoraggio della leishmaniosi canina in nord Italia: aggiornamenti da un network scientifico. *Parassitologia* 2004;46:193-7.
9. Schantz PM. Echinococcosis in the USA. Historical perspective and current status. *Int Arch Hydatid* 2004;35:158.
10. Verga M, Michelazzi M, Palestini C, Riva J. Metodologia di analisi e trattamento dei disturbi comportamentali negli animali da compagnia: basi teoriche ed applicazioni pratiche. *Progr Vet* 2004;19:363-8.
11. Mutinelli F, Macri A. Trasmissione della rabbia attraverso organi trapiantati. *Progr Vet* 2005;60:158.
12. Guberti V, Zamboni L. Controllo delle infezioni trasmissibili nelle popolazioni animali in ambiente urbano. In: Bedetti MG, Lasagna E (Ed.). *Congresso di Igiene Urbana Veterinaria*. Roma 14-16 dicembre 1999. Capodarco di Fermo: Litografica COM; 2001. p. 107-13.
13. Guberti V, Fenati M, Corrain R. Gestione sanitaria di animali selvatici e non domestici. In: *Atti del convegno nazionale Il controllo della fauna per la prevenzione di danni alle attività socio-economiche*. Vercelli 8-9 maggio 2001. Assessorato tutela fauna, flora, caccia e pesca provincia di Vercelli.
14. Saraceni M. Randagismo canino, ma quanto costa? In: Bedetti MG, Lasagna E (Ed.). *Congresso di Igiene Urbana Veterinaria*. Roma 14-16 dicembre 1999. Capodarco di Fermo: Litografica COM; 2001. p. 251-2.
15. Battelli, G. Animali in città ed igiene urbana veterinaria: aspetti socio-economici. In: Bedetti MG, Lasagna E (Ed.). *Congresso di Igiene Urbana Veterinaria*. Roma 14-16 dicembre 1999. Capodarco di Fermo: Litografica COM; 2001. p. 49-51.