

## DEFINITIONS OF HEALTH AND DISEASE IN TEXTBOOKS OF VETERINARY MEDICINE

Stefan Gunnarsson

*Dept. of Animal Environment and Health, Swedish University of Agricultural Sciences (SLU), Skara, Sweden*

### Introduction

The concept of health, as well as the concept of disease, must be regarded as essential to veterinary medicine. Nevertheless, it appears to be extremely rare that broader discussions about these basic concepts occur within the veterinary society. The increasing diagnostic possibilities to identify diseases make it crucial to define disease and health, as this basic distinction gives the very fundament of disease classification.

The naive definition of health in veterinary medicine seems to be that health is no more than the very absence of disease, which can be considered as a dichotomous definition. I suppose that this position often is the case for basic assumptions in e.g. epidemiology, where the disease frequency commonly is calculated based on that disease is binary, which means that either the animal has the disease or it does not have the disease.

The epidemiological methods used to investigate the excellence of a disease test, e.g. the sensitivity and the specificity of a serological test, is built on the understated assumptions of well-defined concepts of disease and health. However, it seems to be rare that any evaluation of diagnostic methods is based on any scrutiny or precise definitions. For example in a well known textbook on veterinary epidemiology quite extended parts of the book emphasize the theoretical problems associated with diagnostic tests (Martin et al., 1987). But the concept of health and disease is just briefly reviewed and the authors refers to that productivity is commonly used as a surrogate definition of health in veterinary medicine.

Pathology has always been an essential part of veterinary medicine. Naturally it is self-evident that the pathologist should be able to determine health from disease in order to put a accurate diagnosis, although it seems rare to find any explicit definition of these central concepts or even to find the subject being investigated further.

No matter in what area the veterinarian is active, the daily work involves health and disease in animals, directly or indirectly. Therefore, I found it natural to examine how different concepts of disease is used within veterinary medicine, and to examine textbooks in veterinary medicine, e.g. veterinary pathology, internal medicine, epidemiology.

The aim of the present study is to examine how the concepts of "health" and "disease" are defined in veterinary textbooks in pathology, epidemiology, internal medicine and other areas.

### Material and Method

Within the scope of this study I examined the veterinary textbooks at the libraries of the Swedish University of Agricultural Sciences (SLU) during the spring of 2003. The literature examined, compiled veterinary textbooks in

several disciplines, such as pathology, internal medicine, bacteriology and immunology.

My approach in examining the literature was to perform a scanning of the content, indexes and introductory chapters of every volume. The scanning was done to identify any definition or discussion about health and disease. Only textbook with explicit definitions of health and disease were selected for further examination. Thus, this study do not investigate implicit definitions of health and disease, as the identification of such definitions would demand far more advanced analyses, as well as, I would run increased risk of getting arbitrary definitions.

### Descriptive results

About 80 out of the 500 relevant books I found within veterinary medicine were written for non-veterinarians, such as veterinary nurses, farmers or the common man. Thirty-nine of the 500 books (8%) comprised any explicit form of, more or less developed, definition of health and/or disease. Twenty-two books out of these 39 were written for veterinarians or veterinary students, five were veterinary dictionaries, two were handbooks for veterinary nurses and ten were written for farmers or animal owners.

Twenty-five volumes were written in English, four were in German, five were in Swedish, two were in Norwegian, two were in Danish and one volume were written in French.

Four out of 39 volumes were available in several editions. These different editions were counted as single handbooks, and special attention was paid to any added or extended health or disease definition. Different editions revealed an extended or modified definition of health (Blood & Henderson, 1974; Blood, et al., 1979; Blood & Radostits, 1989; Radostits, et al., 1994; Radostits, et al., 2000). Other handbooks had unchanged text sections about health/disease throughout several editions, e.g. a German textbook for veterinary nurses (Geyer & Grabner, 1983; 1988; 1991).

I found that more textbooks written for non veterinarian contained definitions of health or disease, compared textbooks written for veterinarians (15% versus 7%). The three textbooks about alternative veterinary medicine with explicit health definition were written for laymen and covered homeopathic treatment of animals (Brock & Nielsen, 1986; Day, 1995; Thoresen, 1997). These books gave not only a definition of health from point of view of alternative veterinary medicine, but also a definition of what the authors saw as conventional medicine, which they rejected. However, there were no references to other publications in these books.

With few exceptions the books only had one single definition of health or disease. The exception was, apart from the books alternative medicine, a dictionary of

veterinary medicine where alternative definitions of health were given (Blood & Studdert, 1988; Blood & Studdert, 1999).

## Discussion

### *General impressions*

I found that few textbooks had any health definition at all. In general, common textbooks of pathology were lacking any suggestion of how to define health and disease. Typically, textbooks of pathology and internal medicine comprised chapters about each system of organs, i.e. one chapter about diseases of the integument, one about disease of the respiratory system, one about disease of the digestive system and so on. These textbooks contained contributions from several authors, responsible for text sections of the diseases of an organ system or a group of diseases. Then the book chapters were put together by the editors (see for example Thomson, 1988 or Ettinger & Feldman, 2000). This type of books rarely contained any introductory part covering the very concept of disease.

### *Categories of health definitions*

A subdivision of health definitions is in itself arbitrary. However, such a division may increase the possibility to comprehend heterogeneous items of more or less developed definitions of health and disease. My subdivision should be regarded as a tool to bring order in this study, rather than to establish a definition of schools of the subject once for all.

I found different approaches to the concept of health and disease in the literature reviewed. My suggestion is to split it into the following five categories:

1. Health as normality
2. Health as biological function
3. Health as homeostasis
4. Health as physical and psychological health
5. Health as productivity including reproduction

#### *1 Health as normality*

It is relatively common to look at 'health' and 'disease', as normal or abnormal. However, these definitions are usually very limited in their extension and sometime only fragments. An example of normality definition comes from a manual for animal health auxiliary personnel written by FAO (1983), where a healthy animal is described to have a normal appearance and behaviour. The animal should have normal features, including normal body position and movements. This definition is actually not a definition of the concept of health as such, but an operational definition of clinical health, assuming normality.

John Webster's (1987) has a similar approach to health in his disease definition which relates disease to a normal state, which is not further defined.

*The best way to recognise signs of ill-health in a cow is to stand and stare at healthy cows 'long and long', for signs of ill health always appear as departure from normality in posture, movement, alertness, appetite, etc., and the first signs may be very very subtle.* (Webster, 1987)

Furthermore, Webster puts our attention to the importance of getting clinical experience of the normal health animal in order to understand the normal variation of healthy animals.

In a German veterinary dictionary (Wiesner & Ribbeck, 1983) 'disease' is defined as disturbance of the normal function of the body.

*Krankheit: Störung der normalen Funktion des Körpers oder seiner Organe und Organsysteme als Ergebnis verschied. exogener Faktoren (Exposition, Umwelt) im Zusammenhang mit einer sich zeitweilig ändernden Anfälligkeit (Disposition) sowie der Reaktionseigentümlichkeit des Organismus.* (Wiesner & Ribbeck, 1983)

Arnall och Keymer (1975) define health as a soundness of the body and an absence of disease, which assume that there is a normality of health. They refer to definitions of health without giving a clear opinion of their own.

*Everyone understands the general meaning of health, but it is not easy to define the state precisely. Dictionaries give varying definitions: "a soundness of body" or "a normal condition of body with all its parts functioning well", whilst one authority merely states that it is "an absence of disease".* (Arnall & Keymer, 1975)

Baker and Greer (1980) gives a semantic analysis of the disease concept before they propose a normality-based health concept.

*Disease may be correctly defined as "not at ease" because the prefix "dis" denotes reversal or separation from the root "ease". Animal ill health is synonymous with the word "disease". They both describe a condition that results from any structural defect or functional impairment of the animal body. Some diseases are not easily detected until they are in the terminal stages; however, most diseases are manifested by signs of disturbances called symptoms. The herdsman should be fully aware of the appearance, movement, and daily habits of healthy animals so that he can detect any abnormal behaviour early.* (Baker & Greer, 1980)

In the previous definitions there are clearly stated attempts to base the health concept on normality, but elements of biological function is also introduced as relevant (Baker & Greer, 1980; Hoopes och Thwaites, 1997). The passage by Baker and Greer (1980) about "structural defect or functional impairment of the animal body" leads us to the next school of definition; Health as biological function.

## 2 Health as biological function

Slauson and Cooper (1990) propose in their textbook of comparative pathology a definition of disease, where the disease can be seen as a manifestation of malfunctioning physiology.

*Disease is a manifestation of physiology gone wrong, and it ultimately reflects some structural or functional alteration in the cells of which all living things are made.* (Slauson & Cooper, 1990)

Gillespie and Timoney (1981) define disease as disturbances of proper performance of body functions.

*Disease may be defined as an alteration of the state of the body, or of some of its organs, which interrupts or disrupts the proper performance of the bodily functions. Functional disturbance soon is manifested by physical signs which usually can be detected by others.*

*Diseases may be of external or of internal origin.* (Gillespie & Timoney, 1981)

Norman F. Cheville (1988) proposes that veterinary pathology is abnormal biology in a wide sense:

*Pathology, in the broadest sense, is abnormal biology. --- Pathology is essentially the search for and the study of lesions, the abnormal structural and functional changes that occur in the body.* (Cheville, 1988)

The idea of biological functioning is related to the idea of homeostasis, which could be said to make functioning more precise.

## 3 Health as homeostasis

Health defined as homeostasis is an old idea. The concept of homeostasis relates to the maintenance of a delicate balance within the organism. This is a common way of looking at health. Here is one example:

*Krankheit entsteht, wenn das normale Zusammenspiel der Körperfunktionen gestört ist. Ihre Entstehung ist abhängig von der Gesamtverfassung des Organismus (Konstitution), von einer Veranlagung und Krankheitsbereitschaft (Disposition) sowie von den auf den Körper einwirkenden äußeren und inneren Krankheitsursachen, z.B. Infektionserreger, Umwelteinflüsse, Giftstoffe, Stoffwechselveränderungen.* (Geyer & Grabner, 1983, 1988, 1991)

The idea of health as homeostasis is commonly used in veterinary homeopathy. In the three homeopathy books I found the discussion about health was quite extended and the homeostasis idea was usually contrasted to conventional medicine. The homeostasis idea was commonly expressed as being holistic, which can be illustrated by Christopher Day (1995), who writes about homeopathic veterinary medicine and conventional medicine.

*In holistic terms, the word "health" implies the concept of a mind and body together in harmony with the environment. When the organism, comprising the mind and the body, is out of the harmony within itself or with its environment, then we have the state of disease (literally dis-ease).*

*Modern conventional medicine tends to view disease as a set of signs and symptoms, recognisable combinations of which are called 'disease'. Each of these given a name and is assumed to have an identity of its own. In holistic medicine we view disease differently. We see the signs or symptoms simply as a result of, and expression of the body's reaction to, the disease forces which impinge upon it, threatening to disturb its internal equilibrium. Like all systems in equilibrium, the body – a very sensitive and active equilibrium system- reacts to disturbing forces in an attempt to retain or regain balance.* (Day, 1995)

Homeopathic health definitions are often stated to be 'holistic' and they are mainly based on the idea that health depending on homeostasis. However, as health definition of conventional veterinary textbooks also can be based on the 'homeostasis idea', it can not be proposed that 'homeostatic thinking' logically leads to homeopathic medicine. One example of this is that Lagerlöf, Hallgren and Ekesbo (1968) define health as a state where all organs are in a delicate balance with each other and with the surrounding world. This definition has been further refined by Ekesbo (2002). These authors clearly belong to conventional veterinary medicine and not homeopathy.

## 4 Health as physical and psychological health

It is common in the debate about animal welfare to propose a wide definition of health which also includes psychological aspects of health (Broom, 1996; Fraser et al., 1997). However, it seems to be uncommon to include welfare and well-being in health definitions of veterinary textbooks. But there are some authors who propose psychological aspects to be included in health definition.

Martin, Meek och Willeberg (1987), make thorough descriptions of theoretically problems related to diagnostic tests, but they give a brief definition of health. They actually gives references to the human health definition stated by WHO, but they also think that productivity is a substantial part of health of farm animals.

*Although health in humans has been defined as a state of complete physical, mental, and spiritual well being, in veterinary medicine, productivity is often used as a surrogate measure of health.* (Martin et al., 1987)

Blood and Studdert (1988, 1999) gives in a veterinary dictionary expression for similar thoughts.

*health a state of physical and psychological well-being and of productivity including reproduction.* (Blood & Studdert, 1988; 1999)

The definition is very short but in my opinion it mixes two different approaches, which could be regarded as contradictory. At first there may not be any conflict

between well-being and productivity, but how do we make priority between these two aspects. Are both parts necessary to fulfil in order to get stay health?

This dual health definition leads us to the last category of health definitions, namely;

#### *Health as productivity including reproduction*

The previous definitions could easily be universal, i.e. the definitions could be applied to all animals including humans. But, it would probably be hard to use a health definition that says that 'Health equalises productivity including reproduction, as a general health definition for humans or other non-producing animals, e.g. pets.

The idea that health in animals solely is the same as productivity is quite rare in the literature, but it is proposed by C. S. G. Grunsell in Black's veterinary dictionary (West, 1995):

--- (health) is now more accurately regarded as a state of maximum economic production". (C. S. G. Grunsell in West, 1995)

However, quite frequently elements of reproduction and productivity are incorporated in health definitions proposed for farm animals. For example Aspinall (1976) makes the following statement:

*It is extremely difficult to give a definition of health, but in practical terms a healthy animal grows, reproduces, and behaves in a manner which has come to be regarded as normal for its species and type.* (Aspinall, 1976)

In Blood and Studdert "Comprehensive Veterinary Dictionary" (Baillière Tindall (1988) respectively W. B. Saunders (1999)), propose several definitions of disease and health.

**Disease** traditionally defined as a finite abnormality of structure or function with an identifiable pathological or clinicopathological basis, and with a recognizable syndrome of clinical signs. Its cause is more often than not unknown.

*This definition has long been widened to embrace subclinical diseases in which there is no tangible clinical syndrome but which are identifiable by chemical haematological biophysical microbiological or immunological means. Nowadays it is becoming so that the definition is used even more widely still to include failure to produce at expected level of nutritional in the presence of normal levels of nutritional supply and environmental quality. It is to be expected that the detection of residues of disqualifying chemical in foods of animal origin will also come to be included within the scope of disease.*

**health** a state of physical and psychological well-being and of productivity including reproduction.

**healthy** 1. a state of being in good health. 2. pertaining to, characterized by, or promoting good health.

(Blood & Studdert, 1988; 1999, texts are identically in both editions)

David Sainsbury (1986) propose a slightly modified definition based on productivity, where he uses the concept of positive health.

*Good health is the birthright of every animal that we rear, whether intensively or otherwise. --- I believe it is not sufficiently understood by those interested in animal welfare that good health may be the most vital factor of all. --- An animal which is medicated to control disease is not as truly healthy as one which is maintaining health by living in a totally favourable environment. No one has found the perfect word to describe this state, but the term 'positive health' has been used and is perhaps a logical expression. Essentially, this means the provision of a complete diet, an environment that is optimal for the animal's physiological needs, comfortable to the animal's senses, in which the animal is secure and free from fear, and with no undue challenge by pathogenic micro-organisms or predators.* (Sainsbury, 1986)

#### *General discussion of concepts*

It is rare that veterinary textbooks give explicit definitions of health and disease. The main reason for that may be that the general purpose of the textbooks is not to investigate what is healthy or what is diseased in principle, but to describe diseases and their causes.

It is not uncommon that textbooks use different aspects of health definition (e.g. Wiesner & Ribbeck, 1983). This makes it harder to actually know what the main health idea is in a textbook.

When an explicit definition of health is presented in a textbook it is almost always given without references to other health definitions. I assume that the reason for this is that the authors are focused on the general topic of the book and not philosophy. It is extremely rare that the general debate of welfare in animals is referred to in veterinary textbooks (e.g. Broom, 1996; Duncan, 1996).

The authors seem to write in isolation from other authors' definition of health and disease. However, there is a remarkable exception and that is the school of homeopathy. All three books about veterinary homeopathy found are referring to what the authors find as 'bad' health definitions, i.e. the mechanistic approach in conventional medicine (Brock & Nielsen, 1986, Day, 1995, Thoresen, 1997).

Homeopathic health definitions are stated to be 'holistic' and are mainly based on the idea that health depending on homeostasis. However, as health definition of conventional veterinary textbooks also can be based on the homeostasis idea, it can not be proposed that 'homeostasis thinking' logically leads to homeopathic medicine. This observation may illustrate that the basic theory behind a health definition do not have inevitable consequences for the veterinary practice.

## Conclusions

The concepts 'health' and 'disease' are rarely defined in veterinary textbooks. The explicit definitions of health can be categorized into five different categories:

- Health as normality, i.e. to define health in relation to what is regarded as normal. Normality could be regarded as biostatistical (quantitative) or as more qualitative.
- Health as biological function, where the deviation or disturbance of the biological processes is regarded as disease
- Health as homeostasis, where homeostasis is an old idea, which relates health to the maintenance of a delicate balance within the organism.
- Health as physical and psychological health, where the health is defined as physical and psychological health, often related to terms like well-being or even harmony.
- Health as productivity including reproduction, which is common in veterinary medicine for farm animals. This definition refer that the concept of "health" in (livestock) animals should integrate, or even be replaced by, productivity and reproduction.

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