

# The Philosophical Roots of the “One Medicine” Movement: An Analysis of Some Relevant Ideas by Rudolf Virchow and Calvin Schwabe with Their Modern Implications

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During the last decade there has been increasing interest in combining veterinary and human medicine, mainly in the areas of vaccination and the eradication of zoonotic and vector-borne diseases. Although the roots of this “One Health-One Medicine” approach can be found in ancient Egypt and Greece, the roots of the philosophy of “one medicine” have not been so thoroughly discussed. In this paper I will analyse some ideas that could unite veterinary and human medicine, from Rudolf Virchow (1821–1902) and Calvin W. Schwabe (1927–2006). Both are recognized as important theoretical founders of the philosophy of one medicine. I will also further develop these thoughts to meet some of the discussions taking place today.

*Keywords:* one health, one medicine, foundation of, theory of, Virchow, Schwabe

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## 1. Introduction

The concepts of *one medicine* or *one health* refer to an approach that combines veterinary medicine, human medicine and biology.<sup>1</sup> Several major international organizations are proponents of the approach, including the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE) (Public Health Agency of Canada 2009).

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<sup>1</sup> I will throughout this paper separate between *one medicine* as the combined approach, *veterinary medicine* and *human medicine*. For clarity reasons I label medicine concerning humans as ‘human medicine’ although the common term of usage is ‘medicine’.

It is undecided whether *one medicine* should be considered a new science requiring a philosophical foundation of its own. Today, this approach is mainly used in practice, especially in the areas of vaccination and the eradication of diseases that are spread by animals as a vector (Enserink 2007). An influential document in the *one medicine* approach, "The Manhattan Principles," states that we must:

recognize the essential link between human, domestic animal and wildlife health and the threat disease poses to people, their food supplies and economies, and the biodiversity essential to maintaining the healthy environments and functioning ecosystems we all require. (Cook et al. 2004)

Recently, Zinsstag et al. (2011) presented a theoretical systemic approach that includes a combination of veterinary medicine, human medicine, and the areas of biology concerning humans, domestic animals and wild animals. Although the paper presents a theoretical model, many of the issues in the philosophy of medicine are left unanswered: Which concepts of health are useful in a combined approach of *one medicine*? What ethical approaches should be implemented? Should there be a shared knowledge foundation between veterinary and human medicine?

Such questions must be addressed in the search for a more comprehensive philosophy of the *one medicine* approach. Throughout history, there have been claims for a combined scientific approach between veterinary and human medicine which can be used to formulate responses to these questions. Two people who advocated more collaboration between veterinary medicine and human medicine were the physician Rudolf Virchow (1821–1902), and the veterinarian Calvin W. Schwabe (1927–2006). I will analyse their thoughts on the relationship between veterinary medicine and human medicine in order to discuss the foundation of a philosophy of one medicine. I will also try to apply this to some of the discussions taken place today.

### 1.1 Demarcation of subject and method

Brief compilations of important names, places, and some of the central thoughts concerning the historical roots of *one medicine* have been done recently by Battelli and Mantovani (2011), Cardiff et al. (2008), Day (2011), and Zinsstag et al. (2011). While the roots of this movement can be traced back to the ancient Egyptians and Greeks, many of the veterinarians and physicians who were involved later on are mentioned in these texts (see Schwabe 1978, Wilkinson 1992). Although many names can be mentioned, only those actually formulating contributions to a philosophy of *one medicine* are here considered. Among those that formulated a philosophy of *one medicine* or at

least parts of it, two names seem to be important: the physician and anthropologist Rudolf Virchow (Battelli and Mantovani 2011, Cardiff et al. 2008, Day 2011, Klauder 1958, Zinsstag et al. 2011), and the public health veterinarian and historian Calvin W. Schwabe (Cardiff et al. 2008, Day 2011, Zinsstag et al. 2011).

Virchow and Schwabe's work contributed at least to the following four areas with regards to the relationship between veterinary medicine and human medicine:

The value of veterinary medical science for one medicine;

Analogies in scientific method;

Similarities in definitions of health;

And the similarities in ethical treatment and the goal of medicine.

Based on empirical evidence, three models (or styles) have been suggested for presenting the history of human medicine as well as the history of veterinary medicine (Dukes 2000, Teigen 1999). These are the following:

1. Celebratory
2. Critical
3. Applied

The celebratory approach is often written by scholars within these two fields, focuses on the discipline's great achievements, and is more biographical in nature. For example, in veterinary medicine, this approach might focus on the importance of veterinary medicine for society. The second approach, the critical, is often written by historians and critically examines, for example, how and why hospitals originated or why certain theories developed. This approach is more explanatory than biographical, and has been characterized by Teigen as "academic medical history ... written by professional historians for other professional historians." The applied approach, on the other hand, tries to apply elements from the history of science to solve modern problems (Teigen 1999).

Several texts describing the history of the *one medicine* movement have used the celebratory style to describe the field's great thinkers. Critical approaches can also be found (e.g. Wilkinson 1992). I will use an applied approach in my aim to elaborate a philosophy of *one medicine*. In my discussion, Virchow and Schwabe's contributions will be analysed in light of contemporary issues.

## 2. The value of veterinary medical science for one medicine

When Rudolf Virchow started as a physician, veterinary medicine was less valued than human medicine. Medical schools for physicians had been established much earlier than veterinary academies, and veterinarians were, for example, not allowed to publish in journals of human medicine.

Early in his career Virchow studied diseases that spread from animals to humans, and realized the importance of veterinary contributions to medicine. In his own journals, such as *Archiv für pathologische Anatomie und Physiologie und für klinische Medizin*, he encouraged veterinarians to publish papers (Lerner 2012), creating a common ground for the two sciences to share knowledge.

Virchow claimed that the two branches should be as one:

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. (Virchow, cited in Klauder 1958 and Schwabe 1978, 1984)

Virchow saw the foundation of both veterinary medicine and human medicine, broadly, as knowledge of life. Virchow saw every cell as a fundamental “seat of life.” He claimed that both biological research as well as pathological research had reached the same conclusion: cells are the origin of life in every organism (Virchow 1881). Since health could be conceptualized through any organism’s vital cells, there was no significant difference between the two branches of medicine.

Calvin Schwabe worked as a veterinarian and was a well-known advocate of public health thinking within veterinary medicine (see Schwabe 1984). He is often labeled a “public health veterinarian” and argued for a *one medicine* approach. He also did studies on veterinary medicine and human medicine in ancient times (Schwabe 1978).

Schwabe agreed with Virchow about the importance of shared journals between the two medical disciplines. In one of his books, *Cattle, Priests, and Progress in Medicine* (1978), Schwabe argued that the shared journals at the end of the 19th century, such as *Journal of Comparative Medicine and Surgery* and the *Veterinary Journal and Annals of Comparative Pathology*, were proof that the branches needed further cooperation. Schwabe quoted an editorial in an 1884 issue of the former:

veterinary science, as we understand it, is not the veterinary medicine taught in the few [English language] schools at present existing. It is not the ‘horse doctor’ knowledge which people think sufficient for the veterinary practitioner. The veterinary science which we have in mind would serve as the very foundation stone for further progress in human medicine. (quoted in Schwabe 1978, 223)

Schwabe (1978) claimed that, in ancient times, veterinary medicine was more valued than human medicine. At that time, there were general practitioners that treated both animals and humans, as well as specialists who only treated certain species, such as cattle specialists. There were no specialists for humans or particular human diseases. Specialists seemed to be more valued than general practitioners.

Schwabe (1978) also claimed that when general practitioners treated both animals and humans, real progress was made in medical science. This implies that a shared knowledge between human and veterinary medicine is good. Therefore another important aspect of the shared ground for knowledge is a shared education. He tried to outline a new kind of veterinary education, based on the *one medicine* perspective, where basic courses could be shared by physicians and veterinarians (Schwabe 1978, 1984). Schwabe did not believe that it was possible to change the human medical curriculum, and therefore proposed changes to the veterinary program. According to Schwabe, a 'Model School of Veterinary Medicine' should have three foci of study: population, people, and biology (Schwabe 1984).

I find this conclusion troublesome. Schwabe argues that to improve the status of veterinary medicine, its curriculum had to be made similar to human medical school. That Schwabe believed the veterinary medicine curriculum, not the human medicine curriculum, should be changed, indicates that he valued veterinary medicine less than human-centred medicine. I argue that Schwabe instead, and more in line with his historical studies, should claim for a combined veterinary and human medical school. One could still educate physicians and veterinarians, but also a new group somewhere in between the two. This new group could be trained to be interdisciplinary generalists in *one medicine*. Kahn (2011) has proposed that schools of public health could provide a home to this type of program.

Schwabe seemed to have a stronger emphasis on the importance of veterinary medicine than Virchow. Schwabe (1984) claimed that veterinary medicine is the link between human medicine and biological science and as mentioned above needed for human medicine to make progress. Dukes (2000) strengthens this view in his listing of a number of cases where the attempt to eradicate a human disease was primarily motivated by a concern about the disease in cattle or another animal, rather than people.

The great interest today by leading international organizations in the *one medicine* approach (Public Health Agency of Canada 2009) shows that veterinary medicine and human medicine could work together.

### 3. Analogies in scientific method

There are also analogies between veterinary medicine and human medicine in scientific methods. For instance, Virchow defined health in terms of vital cells. The study of cells in both humans and animals is crucial in all kinds of medicine. For Virchow, *one medicine* relied on the localisation of disease rather than the study of symptoms (Virchow 1881).

Calvin W. Schwabe, on the other hand focused on another analogy when he claimed, in *Veterinary Medicine and Human Health*, that:

...veterinary medicine shares with public health a unique practice philosophy based upon identical population concepts. Public health is, in essence, the practice of human "herd" medicine... (Schwabe 1984, 9)

Schwabe saw a connection between veterinary medicine, as applied to herds (not individuals) and human public health, which is based on epidemiology. This common ground is the focus on disease, and its spread and prevention within populations. According to Schwabe, then, public health and veterinary medicine share an emphasis on preventive medicine and disease control (Schwabe 1984, 10).

Prevention was also central in Virchow's theory formation. For instance, as a result of his work on trichinosis he created a method to decrease risk: minimize the infection risk to pigs, introduce inspection of meat before usage, and cook meat properly (Lerner 2012).

Schwabe recognized another important analogy between public health and veterinary studies. Economic considerations seemed to be similar within the two disciplines:

Public health measures must be economically realizable by the community in much the same way as the rural veterinarian's choice of methods must be dictated by the value placed by the livestock owner upon his herd. (Schwabe 1984, 9)

Still, Schwabe suggested that the two branches offered unique contributions to *one medicine*, where human medicine focused on the intensive treatment of disease, while veterinary medicine focused on prevention.

I have tried to show that there is a common ground of knowledge in both veterinary medicine and human medicine, and that analogies exist in terms of method as well as economics. I have mentioned similarities in the definition of health without any further discussion (see Section 2). Let us now turn to that discussion.

#### 4. Similarities in definitions of health

Here I will try to outline some of the restrictions that might be needed to incorporate both animals and humans within the same science. “Health” might be defined in various ways and on different levels. Let us start with the different levels of health.

Lund and Röcklinsberg (2001) argued that one must distinguish at least between three levels: the individual, the species, and the ecosystem in which the animal or human is considered.<sup>2</sup> Terms for health on the ecosystem level might be ‘agroecosystem health’, ‘ecosystem health’ and ‘river health’ (Lerner 2008, 76–77). This level of health is important for one medicine as a whole, though it is also important in biology. I will not discuss this further in this paper because the level applies more to the biological part of *one medicine* than the human or veterinary parts.

On the species level, Schwabe’s analogy between public health and herd health could be a strong element in the theory of one medicine. Both public health and herd health deal with populations. Public health deals with the spread of diseases and has important preventive approaches.

At the individual level, a definition of health that covers all animal species including humans can be found. For example, one can argue for a reductionist definition of health based on biology, like Virchow, who talked about health at the cellular level. Modern versions of biological definitions have focused on health as coping or health as fitness (see Nordenfelt 2006). Such attempts to define health have been challenged by those who believe that human life requires a more complex definition than biology affords.

Within modern veterinary medicine more holistic definitions are available. Since the 1980s, a lot of effort has been invested in researching animal suffering (Lerner 2008), which indicates that animal’s mental lives, like peoples’ are important. There have been several fruitful attempts to define animal health in holistic terms, including aspects of mental health (Lerner 2008, 50–51). One of these definitions resembles the WHO’s, though it lacks the psychological component:

Health is a state of complete physical and social well-being and not merely the absence of disease or infirmity. (Kelly 2000, 49)

With today’s knowledge of the psychological life of animals one might also add psychological well-being to Kelly’s definition. Other notable attempts to extend holistic health definitions for humans to animals have been made (Nordenfelt 2006). Still there might be differences between humans and animals worth considering (see Section 5.3).

<sup>2</sup> They actually discuss the concept of animal welfare, but their theoretical idea could also be applied to the discussion of health (see Lerner 2008, 76–77).

## 5. Similarities in ethical treatments and the goal of medicine

A combined approach of human and veterinary medicine needs an ethical framework, and should address questions such as: should humans and animals be given equal weight? Should the approach be mainly concerned with human medical issues? Should veterinary medicine adopt human medical ethics and goals? Or should there be a mutual relationship where both branches learn from each other? I will first try to answer some of these questions through Virchow and Schwabe's work on animal experimentation. Next I will discuss the similarities of the two sciences' goals. Finally I will raise one problem for this combined approach.

### 5.1 The value of animals

Both Virchow and Schwabe were proponents of animal experimentation as an important way to gain knowledge. For Virchow this was one of the methods of human medical science, while Schwabe clearly stated that:

Man *is* more important than animals. And it is a simple fact that animal studies provide an irreplaceable approach to medical progress whose potential has, if anything, been grossly underexploited. (Schwabe 1978, 198)

To analyse the different ethical positions in the discussion of animal experimentation, one can look to Anders Nordgren's *For our Children. The Ethics of Animal Experimentation in the Age of Genetic Engineering*. He differentiates between five different positions:

1. Human dominion
2. Strong human priority
3. Weak human priority
4. Equal considerations of interest
5. Animal rights

The positions are arranged on a scale from a view that is most supportive of animal experimentation to the least. The first one acknowledges that no animal interest is considered. Humans do not take any consideration of animals in their ethical thought. The second and third acknowledges animals' interests, but when human interests are stronger, they win. The difference is that in the second approach human's interests win more easily. The fourth position sees human and animal interests as equal. The fifth position acknowledges the inherent value of both animals and humans.



Those who support animal experimentation could be placed in positions 1 to 3. Schwabe and Virchow would likely have had either a strong human priority-position (2) or a weak human priority-position (3). None would have taken a human dominion-position (1). They both share the idea that the purpose of experimenting on animals is not only for people's sake, but for the treatment of animal diseases. One might also argue that they might have taken an equal consideration-position (4). Their aim was to eradicate diseases that strike both humans and animals. Still, in their arguments, animals are used for human purposes when it is necessary, indicating strong to weak human priority.

In *An address on the value of pathological experiments*, Virchow argued that if we accept that the criterion for torture in animals is pain, all practices that impose pain on animals could be abandoned. Then he focused on companion animals, arguing that some methods in dog-rearing inflict as much pain as animal experiments:

The dog-fanciers, who in their rearing of their dogs often use, or cause to be used, methods full of torture and painful chastisement, would readily come into great danger. (Virchow 1881, 203)

Virchow stated that if methods performed on companion animals are acceptable, so should be experimental research. Virchow argued that animal companions should not be stolen or sold to an experimenter. All animals in experiments should be properly brought to the laboratory. (This sounds similar to the legislation today where the European Union only allows animals bred for experimentation purpose to be used as research animals.)

Virchow and Schwabe claim that the principles of ethics in veterinary medicine and human medicine should be share in the one medicine approach. There might still be aspects that are crucial for one of the sciences but not to the other. This would hinder a combined approach (see Section 5.3). All aspects of ethics within human medicine might therefore not be applicable to veterinary medicine. Still, some claim that a similar ethics might be used.

Within veterinary medicine, Mullan and Main (2001) have claimed that the biomedical principles, proposed by Beauchamp and Childress, which are used in human medicine, could be applied to veterinary medicine. In the clinical setting there are similarities when it comes to ethical conflicts. For instance, a physician must consider both a patient and their relatives, who sometimes have conflicting interests. Similarly, a veterinarian has to deal both with the patient (animal) and the relatives (owner and other family members) (Lerner et al. 2011). The similarity in this triad has been discussed but not been analysed in depth and could be an interesting area for further research.

## 5.2 The goal of medicine

Let us now turn to whether there could be a united goal of one medicine. Similarities in the goals of veterinary and human medicine have earlier been discussed (see Lerner et al. 2011). Here, there are at least two important questions within this topic, both of which are primarily ethical in nature:

1. What should be the goal?
  - a. Treating, preventing, and, when possible, eradicating diseases?
  - b. Promoting wellbeing?
2. How should this goal be reached?

The goal of one medicine seems to be preventing disease (1a), with the assumption that well-being will follow. For example, high living standards (for example, separate areas for farm animals and living) and vaccination programmes often facilitate well-being. To promote well-being (1b) might be a result of effort in (1a).

To address the second question, one might also need to go outside the scope of human or veterinary medicine. Virchow argued for better living standards, such as proper roads, freedom etc. to minimize epidemic outbreaks (Lerner 2012). Still, the widening of the goal leaves us with further questions on how to properly implement the goal. In a more modern paper, Zinsstag et al. (2011) pose such questions still unsolved:

How can we provide health care to still growing human and animal populations without losing all the gains due to menacing malnutrition, and how can we attempt to halt resource depletion? How do we deal with a devastating human resource crisis in human and animal health personnel? How do we provide health to a 2000 Watt society? How do we control trans-boundary diseases if surveillance systems are inadequate and barely operational? How do we control communicable diseases if available funds for control are diverted by corrupt authorities?

Although the one medicine approach has benefits, such as a very wide scope, there are flaws, which I will now discuss.

## 5.3 The limits of the one health approach

I have tentatively tried to develop a common ground for the *one medicine*-approach, recognizing that important questions remain unanswered. Still I end up in the possibility of a one medicine approach that is too wide. Here I will briefly focus on what seems to be hard to fit into a one medicine-approach.

There seem to be parts of human medicine that at present day do not have similarities within veterinary medicine, such as treatments regarding speech (by surgery or training). Also, the treatment of species-specific (human) psychological disorders seem difficult to address in a combined approach, although the psychological aspects of disease in animals have grown in importance throughout the last few decades (Lerner 2008). These areas require further research.

## 6. Conclusion

I have attempted to elucidate some of the elements required for a theoretical foundation of the one medicine movement. Through the work of Rudolf Virchow and Calvin W. Schwabe, I have pointed to some of the important considerations within the approach: knowledge sharing, analogies between the sciences, and science's ethical principles and goal. Only time will tell whether a theoretical framework of one medicine is adopted or whether one medicine will continue as a practical approach. If a theoretical framework is adopted, then one needs to decide how wide or narrow it should be.

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