From Zoonoses to One Health, Passing Through Professor Adriano Mantovani

by Arcangelo Gentile*

Abstract
The importance of the awareness that animals, humans, and environment are interconnected and can no longer be approached separately has finally been receiving more and more consideration and is summarized in the term "One Health". A visionary and staunch advocate of the One Health concept can be considered prof. Adriano Mantovani (1926-2012), professor of veterinary infectious diseases at the University of Bologna, that already in the 1950s promoted not only the necessity of interdisciplinary collaboration and unity between human and veterinary medicine, but also the importance of inserting the two medicines in the social and environmental global contests. Without doubt, he can be considered a pioneer of the "One Health".

Keywords
Veterinary public health, One Health, professor Adriano Mantovani.

It is now clear: animals, humans, and the environment are so interconnected that they can no longer be considered separately. This intricate web involves health and disease, climate and natural disasters, human behaviour and social phenomena, local and global economies, wars and the unequal distribution of wealth, and even the lack of basic needs such as education, safe drinking water, food, housing, and healthcare services.

A forerunner of the One Health concept, although limited in scope, is the term *zoonosis*. The credit for coining this term goes to Rudolf Virchow (1821-1902), the first to give scientific value to the shared diseases between humans and animals.

Since ancient times, humans have been aware of the risk of "falling ill" due to animals and the environment, which has influenced prejudices, popular beliefs, and religious dogmas. It was evident in antiquity that epidemics often struck both animals and humans simultaneously, perhaps as a form of divine punishment. With the advent of veterinary medicine and the development of comparative pathology (already in use during Aristotle's time), connections between diseases and professions became apparent. Observations emerged that certain diseases primarily affected individuals who worked closely with animals or their products, or those engaged in specific types of labor – an

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issue that became even more pronounced during the Industrial Age.

With the rise of microbiology, the zoonotic link between certain etiological factors became clear, evolving from the concept of "poisonous agents" to microbial agents. A major breakthrough came with the acceptance that transmission could also occur in the reverse direction, from humans to animals.

Bruno Galli-Valerio (1867-1943), in *Zoonoses. Diseases Transmissible from Animals to Humans* (1894), and Alberto Ascoli (1877-1957), in the *Italian Veterinary Yearbook* (1935), revisited the term zoonosis, giving it nosographic significance. Ascoli classified the most important zoonoses, listing glanders, anthrax, and rabies at the top.

The term *zoonosis* was officially recognized by the World Health Organization (WHO) in 1951, when it provided the first formal definition ("infections in humans... shared in nature by other vertebrate animals") and compiled a list of over 80 diseases transmissible to humans. With zoonoses now well-defined, they paved the way for the advancement of public health. That same year, the WHO established the Veterinary Public Health Unit and the WHO/FAO Joint Expert Group on Zoonoses.

However, to transition from zoonoses to One Health, one crucial element was missing: the relationship between the animal-human duo and the broader environment. This concept aligns with the definition found in *Treccani*: "a complex system of physical, chemical, and biological factors, of living and non-living elements, and of relationships in which all organisms on the planet are immersed", a concept now broadly referred to as the *biosphere*.

It was from this perspective that, in the 1950s, Professor Adriano Mantovani (1926-2012) emerged as a key figure. He was a professor of *Infectious Diseases, Prevention, and Veterinary Health Policies* at the Faculty of Veterinary Medicine in Bologna, Director of the Parasitology Laboratory at the Italian National Institute of Health, and Director of the WHO/FAO Collaborating Center for Veterinary Public Health in Rome. A visionary and staunch advocate of what would later be established as One Health, he is rightfully considered a pioneer – indeed, the father – of veterinary public health.

Firmly convinced of the necessity of interdisciplinary collaboration, Mantovani had a clear vision of the unity between human and veterinary medicine. His approach spanned epidemiology, zoonosis and infectious disease control, urban veterinary hygiene, health education, and even veterinary intervention in emergencies and disasters. In this regard, driven by a strong political sense of participation and social commitment, in 1980 he actively coordinated veterinary services in areas affected by the Irpinia earthquake, laying the groundwork for WHO guidelines in cases of non-epidemic emergencies.

It is true that the One Health concept was simultaneously developing in other parts of the world. However, such a broad and forward-thinking interpretation was found only in this controversial and often debated, yet relentless pioneer: Professor Adriano Mantovani.