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J Sex Gender Specif Med 2026; 12(3): online ahead of print

Completing One Health: why sex and gender matter

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Received 12 June 2026; accepted 1 September 2026

The concept of One Health has evolved over time in parallel with the expansion of scientific knowledge and the growing awareness of the profound and interdependent relationships that govern life on our planet. This evolution has also been driven by the recognition of the increasingly severe impact of human activities on ecosystems and, consequently, on collective health.

The most recent definition, jointly adopted by the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (WOAH), and the United Nations Environment Programme (UNEP), describes One Health as "an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems".[1] This formulation marks a significant conceptual shift: from a predominantly operational model focused on collaboration among professions and disciplines to a broader and more substantive vision of health as a systemic and shared good.

For many years, One Health was primarily associated with cooperation between human and veterinary medicine, particularly in the prevention and control of zoonotic diseases.[2] Today, however, the magnitude of global challenges — from pandemics and climate change to environmental pollution and the depletion of natural resources — highlights the need for a paradigm capable of interpreting health as the outcome of complex interactions among biological, social, and ecological systems.[3,4] Within this context, the environment, long the neglected component of the One Health triad, has progressively emerged as an essential and indispensable element.

Perhaps the most significant and ambitious innovation introduced by the recent definition of One Health lies in the idea of simultaneously "balancing and optimizing" the health of people, animals, and ecosystems. This formulation implicitly invokes the concept of co-benefits: the need to design interventions capable of generating positive and synergistic effects across all domains involved. Health is no longer conceived as the product of sector-specific actions but rather as a unified, comprehensive, and shared dimension encompassing all three components, requiring integrated strategies and multidimensional evaluation frameworks.[5]

It is precisely within this evolving framework that the need emerges to introduce an additional dimension of analysis: sex and gender differences. While One Health has expanded the scope of inquiry beyond the traditional boundaries of medicine by recognizing the need to integrate human, animal, and environmental health, sex- and gender-specific medicine helps overcome another, less visible yet equally important simplification: the assumption that the human population constitutes a homogeneous entity.[6,7] Both paradigms challenge reductionist approaches and share a common epistemological objective: understanding complexity through the inclusion of previously neglected determinants and interactions.

Research in sex- and gender-specific medicine has demonstrated that biological and sociocultural factors profoundly influence exposure to risks, disease susceptibility, treatment responses, access to healthcare services, and health outcomes.[8] Sex and gender are not merely descriptive variables but cross-cutting determinants that permeate all areas of medicine and public health. From this perspective, sex- and gender-specific medicine does more than add a new specialty to the scientific landscape or improve equity in healthcare interventions. Rather, it provides an interpretative framework capable of refining and strengthening the entire One Health approach, thereby contributing to the generation of co-benefits across its three domains.

The relevance of this integration becomes particularly evident in light of the planetary crises that characterize our time, of which human beings are both victims and, to a large extent, responsible. Climate change, pandemics, environmental pollution, natural resource depletion, and biodiversity loss are profoundly reshaping the determinants of health, generating consequences that affect individuals, communities, and ecosystems alike. These phenomena, however, do not affect human populations uniformly. Sex and gender differences influence exposure to environmental risk factors, biological vulnerability, and adaptive capacity, thereby contributing to the amplification of pre-existing inequalities.[9] In many contexts, women and men experience different risks and consequences as a result of social roles, working conditions, access to resources, and participation in decision-making processes.

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Likewise, because human activities are recognized as the primary drivers of these crises, it is important to acknowledge that contributions to the processes that generate and sustain them are not evenly distributed across the population. Sex and gender influence the ways and extent to which individuals and social groups participate in the dynamics that drive contemporary environmental transformations or, conversely, contribute to their mitigation and to the management of their consequences. Patterns of consumption, resource use, production practices, mobility behaviours, concern for environmental issues and animal welfare, as well as the capacity to influence political and economic decisions, are unevenly distributed and reflect social and cultural structures that are deeply intertwined with gender relations. For example, numerous studies indicate that women tend to express higher levels of concern for animal welfare, animal rights, and the ethical implications of animal farming. This greater sensitivity is reflected in a stronger propensity to support animal protection policies and to modify dietary habits for ethical and environmental reasons.[10] Understanding these differences is therefore essential for analysing the interactions among human, animal, and ecosystem health and for developing effective and equitable prevention and intervention strategies. Because One Health aims to generate co-benefits across its three domains, acknowledging gender-related differences in attitudes and behaviours may support more effective interventions capable of simultaneously improving nutritional health, reducing environmental pressures, and enhancing animal welfare.

The dual perspective which considers gender both as a factor influencing vulnerability and as a determinant of the pressures exerted on ecosystems suggests that sex- and gender-specific medicine can offer One Health far more than a specialized contribution. It represents an essential tool for understanding the complexity of interactions among society, animals, the environment, and health, thereby improving our ability to identify truly effective interventions and generate co-benefits across all three domains of the paradigm.

For these reasons, the integration of a sex- and gender-sensitive perspective, together with the systematic collection of sex- and gender-disaggregated data in One Health research, should be considered a fundamental and structural component of the paradigm.[11]

The incorporation of sex and gender perspectives should influence research design, surveillance systems, risk assessment, policy development, and evaluation of One Health interventions. If the goal of One Health is to promote equitable and sustainable health both among human beings and in their relationship with the planet, then understanding sex and gender differences becomes a necessary condition for achieving that goal. Without such integration, One Health risks remaining incomplete: capable of recognizing the interdependencies among species and ecosystems, yet still unable to fully address those that exist within human populations themselves.

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Conflicts of interest statement. The Author declares no conflicts of interest.

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