

The main zoonoses and their impacts on humans and animals: A literature review

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Abstract— Zoonoses represent a group of infectious diseases that can be transmitted between animals and humans, posing a significant challenge to public health, veterinary medicine, and other related professions. This article presents a detailed review of the main zoonoses, addressing viral, bacterial, parasitic, and fungal etiological agents, their transmission routes, clinical manifestations, socioeconomic impacts, and prevention strategies. Furthermore, it highlights the effects of zoonoses on both human health and animal welfare. Understanding these diseases is essential for the implementation of integrated health policies, reinforcing the One Health approach, which recognizes the interdependence between the health of humans, animals, and the environment.

I. INTRODUCTION

Zoonoses represent a diverse group of infectious diseases characterized by their ability to be transmitted from animals to humans and vice versa. It is estimated that more than 60% of emerging infectious diseases in humans originate from animals, with significant implications for public health and the global economy (Halliday et al., 2017).

Increased contact between humans and animals, whether in urban, rural, or wild environments, has raised the incidence of these diseases. Factors such as deforestation, agricultural expansion, globalization, climate change, and population growth contribute to the emergence of new zoonoses (Karesh et al., 2012). Furthermore, the population density of domestic and intensively farmed animals favors the circulation of infectious agents, increasing the risk of transmission to humans.

Zoonoses have a direct impact on humans, manifesting as symptoms ranging from mild to severe and potentially fatal, in addition to generating costs for medical

care, loss of productivity, and trade restrictions. In animals, these diseases can lead to morbidity, mortality, decreased productivity, reproductive loss, and suffering, affecting both production animals and pets (WHO, 2020).

This article reviews the main zoonoses, detailing their etiological agents, modes of transmission, clinical manifestations, impacts on humans and animals, and preventive measures. The integration of human medicine, veterinary medicine, and environmental health is essential for mitigating these effects.

Zoonoses represent a significant group of infectious diseases transmitted between animals and humans, with a substantial impact on global public health. It is estimated that more than 60% of human infectious diseases have a zoonotic origin, encompassing viruses, bacteria, parasites, and fungi.

In Brazil, the main zoonoses include leptospirosis, visceral leishmaniasis, hantavirus, toxoplasmosis, rabies, brucellosis, bovine tuberculosis, giardiasis, dermatophytosis, and cutaneous larva migrans.

Leptospirosis, for example, has an annual average of more than 3,600 cases and 375 deaths, with a lethality rate that can reach 40% in some regions. Visceral leishmaniasis, a neglected tropical disease, affects between 200,000 and 400,000 people annually, with approximately 20,000 to 40,000 deaths, making Brazil one of the countries with the highest number of cases.

Hantavirus, transmitted by rodents, accounts for approximately 100 cases annually in Brazil, with a mortality rate of about 46%. Human rabies, although declining due to vaccination programs, still represents a risk, with five deaths recorded in 2025, the highest number since 2018.

Furthermore, diseases such as toxoplasmosis, brucellosis, and bovine tuberculosis continue to pose significant public health challenges, especially in rural areas and communities with limited access to health services. Giardiasis and dermatophytosis, while less lethal, affect a large portion of the population, mainly children and rural workers.

These statistics highlight the importance of epidemiological surveillance, prevention, and control of zoonoses, emphasizing the need for an integrated approach between human, animal, and environmental health. Collaboration among professionals in these areas is essential to reduce the incidence and impact of these diseases on society.

II. LITERATURE REVIEW

Zoonoses Viral

Among viral zoonoses, rabies stands out due to its lethal impact on humans and the importance of its control in domestic animals. Caused by a virus of the genus *Lyssavirus*, rabies is mainly transmitted through bites from infected mammals, with dogs being the main vector in endemic regions (Fooks et al., 2017).

In humans, the disease manifests with severe neurological symptoms and, without adequate post-exposure treatment, has a mortality rate close to 100%. In animals, rabies causes behavioral changes, aggression, and death, being a critical public health indicator. Another relevant viral zoonosis is Hantavirus, transmitted by rodents, which causes cardiopulmonary syndrome, with high human mortality (Jonsson et al., 2010). In animals, the infection is asymptomatic, but they act as reservoirs, facilitating the spread of the virus.

Avian influenza, caused by type A viruses, has a high zoonotic potential. Infected humans can develop fever, severe respiratory symptoms, and acute respiratory complications, while domestic and wild birds exhibit high mortality, impacting poultry production (Alexander, 2007).

The impact of these viral zoonoses highlights the need for epidemiological surveillance, animal vaccination, biosecurity, and public education to reduce transmission between species.

Zoonoses Bacteria

Bacterial zoonoses exhibit great diversity and clinical relevance. Leptospirosis, caused by *Leptospira* spp., is transmitted through the urine of infected animals, contaminating water or soil (Levett, 2001). In humans, it manifests with fever, jaundice, hemorrhages, and renal failure, and can lead to death. In animals, it causes fever, jaundice, and abortions, especially affecting cattle, pigs, and rodents.

Salmonellosis is a zoonotic disease of bacterial origin caused by different serotypes of *Salmonella* spp., belonging to the *Enterobacteriaceae* family. It is one of the main agents of foodborne infections in the world, with high importance in public health due to its wide distribution and economic impact (GUERRERO et al., 2020).

From an epidemiological point of view, transmission occurs mainly through the ingestion of contaminated animal-derived foods, such as meat, eggs, and milk, in addition to cross-contamination in food handling environments (MELO et al., 2019). Studies indicate that factors such as inadequate hygiene practices, consumption of raw foods, and antimicrobial resistance contribute to maintaining the epidemiological chain of salmonellosis (SANTOS; OLIVEIRA, 2021).

In humans, clinical signs generally manifest acutely, including fever, diarrhea, abdominal pain, nausea, and vomiting. In more severe cases, especially in children, the elderly, and immunocompromised individuals, bacteremia and systemic complications may occur (BRASIL, 2020). In animals, the symptomatology varies according to the species and clinical condition, and can range from diarrhea to septicemia (SILVA et al., 2018).

Treatment is based on fluid and electrolyte replacement, with antibiotic therapy restricted to severe or systemic cases due to the risk of selecting resistant strains (WHO, 2021). The indiscriminate use of antimicrobials in veterinary medicine and animal production is a worrying factor, as it favors the spread of bacterial resistance (ALMEIDA; ROCHA, 2017).

Prevention and control measures include good food hygiene practices, sanitary inspections in production chains, and health education programs aimed at the population. Furthermore, monitoring antimicrobial resistance in *Salmonella* spp. is fundamental for public health and veterinary medicine strategies (FERREIRA et al., 2020).

Therefore, salmonellosis represents a multidimensional challenge, requiring integrated approaches within the One Health concept, which encompasses the interface between human, animal, and environmental health.

Bacterial zoonoses demonstrate the need for food hygiene, sanitary management, and constant monitoring of herds to prevent transmission.

Brucellosis is a bacterial zoonosis with a wide global distribution, caused by species of the genus *Brucella*, affecting domestic animals and humans, and is considered a serious public and animal health problem (CORBEL, 2006). Transmission occurs mainly through direct contact with secretions or tissues of infected animals and through the ingestion of unpasteurized dairy products (SELEEM; BOYLE; SRIRANGANATHAN, 2010). In humans, it manifests as a prolonged febrile illness, associated with fatigue, arthralgia, and systemic complications, with a significant impact on quality of life (PAPPAS et al., 2006).

In the context of livestock production, the disease causes economic losses related to infertility, abortions, and a drop in milk production, being considered one of the main sanitary barriers to the international trade of animals and animal products (GODFROID et al., 2011). For cattle, vaccination with the *B. abortus* S19 strain is an essential strategy in controlling the disease, although it has limitations regarding interference with serological tests (NICOLETTI, 2010).

Globally, eradication programs combine early diagnosis, culling of positive animals, and continuous serological monitoring—measures that have already proven effective in developed countries (OIE, 2018). However, in developing countries, brucellosis remains endemic due to structural and epidemiological surveillance difficulties (DEAN et al., 2012). In this context, the importance of the “One Health” approach, which integrates animal, human, and environmental health for the sustainable control of the disease, is reinforced (FRANCO et al., 2007).

Leptospirosis is a zoonotic disease with a worldwide distribution caused by bacteria of the genus *Leptospira*, characterized as an acute febrile illness of great importance in public health (FAINE et al., 1999). Transmission occurs through contact with water or soil contaminated by the urine of infected animals, mainly rodents, and is favored by floods and poor sanitation conditions (KO; GOARANT; PICARDEAU, 2009). In humans, it can range from mild to severe forms, such as Weil's syndrome, characterized by liver and kidney failure, as well as hemorrhagic manifestations (BHARTI et al., 2003).

From a veterinary point of view, leptospirosis affects several domestic and production species, causing abortions, infertility, and decreased productivity, resulting in

significant economic losses (ELLIS, 2015). Animal infection plays a central role in maintaining the epidemiological cycle, with dogs and rats being important urban reservoirs (LEVETT, 2001).

Early diagnosis of the disease is a challenge, since the clinical signs are nonspecific and easily confused with other febrile illnesses (PICARDEAU, 2017). Control of leptospirosis depends on integrated strategies, such as animal vaccination, rodent population control, improvements in sanitary infrastructure, and health education campaigns (ADLER; DE LA PEÑA MOCTEZUMA, 2010). In the current context, the need for surveillance based on the “One Health” concept is reinforced, uniting animal, human, and environmental health to reduce the impacts of the disease (COSTA et al., 2015).

Zoonoses Parasitic

Parasitic zoonoses include diseases caused by protozoa, helminths, and ectoparasites, with significant impacts on humans and animals.

Toxoplasmosis is a parasitic zoonosis with a worldwide distribution caused by the obligate intracellular protozoan *Toxoplasma gondii*, belonging to the phylum Apicomplexa. It is one of the most prevalent infections among humans and animals, with a significant impact on public health and animal production (MONTROYA; LIESENFELD, 2004). The parasite's life cycle involves definitive hosts, felines, in which sexual reproduction occurs, and various intermediate hosts, including humans, in which asexual forms predominate (DUBEY, 2010).

Transmission to humans occurs primarily through the ingestion of sporulated oocysts present in the environment, via contaminated water and food, or through tissue cysts in undercooked meat. Furthermore, vertical transmission is an important route of infection, potentially causing serious fetal consequences (TENTER; HECKEROTH; WEISS, 2000). In immunocompetent individuals, the disease generally presents with an asymptomatic or mild course, while in immunocompromised individuals it can progress to severe forms, including toxoplasmic encephalitis, pneumonia, and myocarditis (HILL; DUBEY, 2002).

From a veterinary perspective, toxoplasmosis is relevant in livestock, especially sheep and goats, being responsible for significant abortions and neonatal losses (INNES et al., 2009). In felines, as definitive hosts, the parasite is eliminated in feces in the form of oocysts, contaminating the environment and perpetuating the disease cycle (ELMORE et al., 2010). Thus, proper management of domestic cats and control of stray felines become important measures for reducing environmental contamination.

The diagnosis of toxoplasmosis in humans and animals is performed using serological methods, such as ELISA and indirect immunofluorescence, and molecular techniques, such as PCR, which allow for the direct detection of the protozoan's DNA (FERREIRA et al., 2017). In the therapeutic field, treatment is based on combinations of pyrimethamine and sulfadiazine, usually in conjunction with folinic acid, although these drugs are not capable of eliminating tissue cysts, making complete eradication of the infection difficult (MONTROYA; REMINGTON, 2008).

Preventive measures are essential for controlling toxoplasmosis, including food hygiene, consuming properly cooked meat, drinking potable water, and public health education (ROBERT-GANGNEUX; DARDÉ, 2012). In livestock, management strategies, experimental vaccination, and controlling exposure to felines are promising alternatives to reduce the prevalence of the disease (INNES, 2010).

Finally, toxoplasmosis must be understood within the "One Health" paradigm, considering its interaction between animals, humans, and the environment, requiring integrated actions of epidemiological surveillance, health education, and food biosecurity (DUBEY, 2020).

Leishmaniasis is a neglected parasitic disease with a wide geographic distribution, mainly in the North and Northeast regions of Brazil. Caused by protozoa of the genus *Leishmania*, the disease manifests in cutaneous, mucosal, and visceral forms, the latter being the most serious and potentially fatal if not properly treated (GONTIJO; MELO, 2004).

Visceral leishmaniasis is transmitted primarily by sandflies of the genus *Lutzomyia*, especially *Lutzomyia longipalpis*, the main vector in Brazil (SILVA et al., 2023). Human infection occurs through the bite of the infected insect, introducing promastigotes that transform into amastigotes in the host cells, triggering varied clinical manifestations (GAZZINELLI et al., 2025).

Epidemiological studies indicate changes in the distribution patterns of visceral leishmaniasis in Brazilian territory. Silva et al. (2023) observed, between 2007 and 2020, a high incidence in municipalities in the North and Northeast regions, with expansion in urban areas due to disordered urbanization and precarious socioeconomic conditions.

Diagnosis of the disease involves laboratory methods, such as the search for amastigotes in bone marrow, liver, or spleen smears, in addition to serological and molecular tests (GONTIJO; MELO, 2004). Conventional treatment is based on medications such as liposomal amphotericin B, which is effective but has significant adverse effects. Recent research has sought safer and more effective therapeutic alternatives (SILVA et al., 2023).

Leish-Tec®, targeting canine visceral leishmaniasis, stand out. Studies indicate that the vaccine induces an effective immune response in dogs, reducing the transmission of the parasite to the vector (GAZZINELLI et al., 2025). Integrated strategies of surveillance, vector control, and health education are essential to combat the disease and minimize its spread (GONTIJO; MELO, 2004).

In summary, visceral leishmaniasis represents a public health challenge in Brazil. Advances in scientific research are essential to improve diagnoses, treatments, and preventive measures, aiming to reduce morbidity and mortality and mitigate its socioeconomic impact (SILVA et al., 2023; GAZZINELLI et al., 2025; GONTIJO; MELO, 2004).

Giardiasis is an intestinal parasitic infection caused by the flagellated protozoan *Giardia. G. duodenalis* (also known as *G. lamblia* or *G. intestinalis*), which affects humans and animals, is a zoonosis with a wide global distribution (FREITAS et al., 2018). Its importance in public health is related to its high prevalence, especially in regions with inadequate sanitation conditions, and its potential to cause outbreaks of waterborne and foodborne diarrhea (FENG; XIAO, 2019).

Epidemiologically, transmission occurs via the fecal-oral route, mainly through the ingestion of cysts present in contaminated water and food or through direct contact between infected individuals and animals (OLIVEIRA et al., 2021). Preschool children, immunocompromised individuals, and populations in situations of socioeconomic vulnerability represent the most susceptible groups (BRASIL, 2019).

The clinical signs of giardiasis range from asymptomatic cases to acute or chronic manifestations. Among the most common symptoms are intermittent or persistent diarrhea, abdominal pain, nausea, flatulence, and weight loss. In prolonged cases, there may be malabsorption of nutrients and impaired child development (CAMPOS et al., 2020).

Treatment for giardiasis is based on the use of antiparasitic drugs, with metronidazole, tinidazole, and albendazole being the most commonly used and effective drugs (ESPOSITO; LUCAS, 2017). However, emerging drug resistance in some *Giardia strains* represents a growing challenge for therapy (FENG; XIAO, 2019). Furthermore, supportive measures, such as hydration and electrolyte replacement, may be necessary in cases of severe diarrhea.

Prevention is closely related to personal hygiene practices, access to drinking water, and basic sanitation measures. Epidemiological surveillance and health education programs are fundamental to reducing the incidence of giardiasis, especially in vulnerable communities (SILVA; BARBOSA, 2018).

Therefore, giardiasis is a parasitic disease of global relevance, requiring integrated actions within the framework of One Health, considering the interface between human, animal, and environmental health.

Zoonoses Fungal

Fungal zoonoses include diseases such as dermatophytosis, caused by fungi of the genus *Trichophyton*, transmitted through direct contact with infected animals or contaminated surfaces (Weitzman & Summerbell, 1995). In humans, it causes circular skin lesions, itching, and discomfort. In animals, it causes alopecia, scaling, and intense itching, impacting the well-being of pets and farm animals.

zoonotic mycoses include infections caused by *Sporothrix* spp., usually transmitted by cats, causing skin lesions in humans and respiratory and cutaneous symptoms in felines (Barros et al., 2011).

Pharmacological treatment

Pharmacological treatment of zoonoses varies according to the etiological agent and the severity of the infection. In viral zoonoses, such as rabies, immediate post-exposure intervention involves the administration of the human rabies vaccine combined with specific immunoglobulin, a measure that is almost entirely effective in preventing the disease when performed correctly (WHO, 2020). In Hantavirus infections, although there are no specific antivirals, clinical management is essentially supportive, including hydration, oxygen therapy, and intensive care for acute cardiopulmonary syndrome (CDC, 2020). For avian influenza, antivirals such as oseltamivir or zanamivir can reduce viral replication and severe respiratory complications, especially in confirmed human cases.

In bacterial zoonoses, the use of antibiotics is the basis of treatment. In leptospirosis, penicillin and doxycycline are used, with greater success when started early. Human brucellosis requires a combination of doxycycline and rifampicin, while severe salmonellosis may require cephalosporins or fluoroquinolones, always considering local bacterial resistance (WHO, 2020).

Parasitic zoonoses include infections caused by protozoa and helminths. In toxoplasmosis, the combination of pyrimethamine, sulfadiazine, and folic acid is indicated, while human visceral leishmaniasis is treated with pentavalent antimonials or amphotericin. Liposomal, and infected dogs receive allopurinol or miltefosine, when permitted (Alvar et al., 2012). Giardiasis uses metronidazole or fenbendazole, depending on the species and severity.

For fungal zoonoses, such as dermatophytosis, treatment combines topical antifungals (clotrimazole, miconazole) with systemic antifungals (itraconazole, terbinafine) in extensive or resistant cases (Weitzman & Summerbell, 1995). The success of treatment depends on early identification of the agent, therapeutic adherence, clinical monitoring, and integration with preventive measures such as environmental control, personal hygiene, and animal vaccination, ensuring clinical efficacy and reducing the risk of reinfection.

PREVENTION MEASURES

Government agencies play a central role in the prevention and control of zoonoses, implementing strategies that involve public health, epidemiological surveillance, and education. Mandatory vaccination programs for dogs and cats against rabies, coordinated by health departments and veterinary agencies, have significantly reduced the incidence of the disease in several regions (WHO, 2020). Herd control and vaccination of cattle against brucellosis, leptospirosis, and other bacterial zoonoses is promoted by agencies such as the Ministry of Agriculture, aiming to protect both animals and humans.

Epidemiological surveillance is carried out by agencies such as the CDC in the United States and the Ministry of Health in Brazil, monitoring outbreaks of emerging zoonoses, such as Hantavirus, avian influenza, and leishmaniasis, allowing for rapid responses. Sanitary inspection of food of animal origin, carried out by regulatory bodies, ensures food safety, preventing the transmission of salmonellosis, toxoplasmosis, and other foodborne zoonoses.

MAIN ZOOSES AND THE ROLE OF THE VETERINARIAN IN PUBLIC HEALTH

Zoonoses represent a group of infectious diseases transmitted between animals and humans, notably rabies, leptospirosis, brucellosis, bovine tuberculosis, toxoplasmosis, visceral leishmaniasis, giardiasis, and dermatophytosis. Increasing urbanization, environmental changes, and the intensification of animal production have amplified the risk of transmission of these diseases, making them a significant concern for global public health.

Veterinarians play a crucial role in the prevention and control of zoonoses, working in epidemiological surveillance, diagnosis, clinical management, and health education. Studies indicate that veterinarians have a superior understanding of zoonotic pathogens and greater proficiency in diagnosing these diseases compared to human physicians (Garcia-Sanchez et al., 2023). Furthermore, their role in the early detection and monitoring of diseases in animal populations allows for rapid responses

to outbreaks, mitigating risks to human health (Melo et al., 2020).

The "One Health" approach, which integrates the human, animal, and environmental dimensions of health, reinforces the importance of collaboration among professionals in these areas for the implementation of effective strategies for the prevention and control of zoonoses (CDC, 2025). In this context, the veterinarian is essential not only in the direct care of animals, but also as a public health agent, contributing significantly to the promotion of collective health and food safety.

Veterinary sanitary control is a fundamental component of public health, as it acts directly in the prevention of zoonoses, which are diseases transmissible between animals and humans. Its relevance is part of the One Health concept, which recognizes the interdependence between animal, human, and environmental health (FERREIRA et al., 2020). In this context, different areas of action complement each other to reduce epidemiological risks and guarantee food and sanitary safety.

Sanitary inspection and surveillance play a central role in this process. The inspection of food of animal origin ensures that meat, eggs, milk, and dairy products are free from biological, chemical, and physical contaminants, preventing outbreaks of diseases such as salmonellosis, listeriosis, and brucellosis (SILVA et al., 2020). The inspection of slaughterhouses ensures that the slaughter, processing, and distribution stages meet hygiene and sanitation standards, preventing the spread of pathogens and protecting the end consumer (GUERRERO et al., 2020).

In the context of companion animal control, several measures are implemented. Quality control involves the adoption of appropriate and regulated veterinary practices to ensure the health of these animals and reduce the risk of transmission of zoonoses such as leishmaniasis and toxoplasmosis (OLIVEIRA; SOUSA, 2021). Anti-rabies vaccination represents one of the most effective and traditional strategies, since rabies is a lethal zoonosis that still poses a threat in developing countries (BRASIL, 2019). Castration, in addition to contributing to population control, reduces the circulation of stray animals, which can be vectors of various diseases. Responsible ownership is fundamental to ensuring continuous care with feeding, hygiene, vaccination and veterinary consultations, reducing abandonment and, consequently, the epidemiological risk (SANTOS; OLIVEIRA, 2021).

Epidemiological surveillance is another essential axis. The notification of zoonoses allows for the systematic monitoring of diseases of public health relevance, such as leptospirosis, leishmaniasis, and rabies, enabling rapid responses from health authorities (FERREIRA et al., 2020).

Monitoring outbreaks ensures the early identification of new threats and prevents their spread, while containment measures, such as isolation, disinfection, and restriction of animal movement, are applied to reduce propagation in emergency situations (MELO et al., 2019).

Prophylaxis and sanitary management in herds also play a strategic role. Vaccination in herds protects not only the animals, but also rural workers and consumers, preventing diseases such as brucellosis and bovine tuberculosis (GUERRERO et al., 2020). The control of parasites, such as ticks and helminths, reduces the incidence of diseases that can compromise both animal productivity and human health, such as babesiosis and ancylostomiasis (OLIVEIRA et al., 2021).

Another key pillar is health education, which promotes behavioral changes and raises public awareness. Biosecurity encompasses practical preventive measures in breeding and handling environments, such as facility disinfection and the use of personal protective equipment, reducing the risk of pathogen dissemination (SILVA; BARBOSA, 2018). Educational campaigns are tools for social mobilization, sensitizing communities about animal care and disease prevention. Food hygiene is equally relevant, as the proper preparation of animal-derived foods prevents gastrointestinal illnesses and food poisoning (CAMPOS et al., 2020). Finally, awareness of the risks of contact with wild animals highlights potential emerging zoonoses, such as spotted fever and arboviruses, which often originate from this host group (FENG; XIAO, 2019).

In this way, every detail of veterinary sanitary control, from food inspection to health education, contributes to an integrated network for the prevention of zoonoses. The adoption of coordinated measures between public bodies, health professionals and society is essential to minimize the impacts of zoonotic diseases, guarantee food safety and protect both animal and human health.

VETERINARY HEALTH CONTROL AND ZOOZONOSIS PREVENTION

Sanitary Inspection and Surveillance

- Food inspection
- Slaughterhouse supervision

Companion Animal Control

- Quality control
- Rabies vaccination
- Neutering
- Responsible ownership

Epidemiological Surveillance

- Zoonosis notification

- Outbreak monitoring
- Containment measures

Prophylaxis and Sanitary Management

- Herd vaccination
- Parasite control

Health Education

- Biosafety
- Educational campaigns
- Food hygiene
- Risks from wild animals

III. DISCUSSION

Zoonoses have direct and indirect effects on humans and animals, impacting health, well-being, productivity, and the economy. In humans, they can lead to hospitalization, mortality, and chronic complications, as well as generating medical and social costs. In animals, they cause suffering, decreased food production, abortions, infertility, and death, affecting food security and the agricultural economy (WHO, 2020).

Prevention requires an integrated *One Health approach*, involving veterinarians, physicians, environmentalists, and public policy (ZINSSTAG et al., 2011). Strategies include: animal vaccination, such as dogs against rabies and cattle against brucellosis; vector control, such as sandflies, rodents, and mosquitoes; environmental and personal hygiene, with emphasis on basic sanitation, access to potable water, and proper waste management; public education and awareness about risks and prevention methods; and epidemiological surveillance, which includes the continuous monitoring of animal and human populations.

The socioeconomic impact of zoonoses is significant, including losses in animal production, increased healthcare costs, and international trade restrictions. Integration between human, animal, and environmental health is essential to mitigate these effects and ensure sustainability.

Furthermore, antimicrobial resistance in zoonotic pathogens is emerging as one of the greatest global challenges. Species such as *Salmonella spp.* and *Escherichia coli* have shown a high capacity to develop resistance, threatening the effectiveness of antibiotics used in both humans and animals (FERREIRA et al., 2020). This phenomenon demonstrates how inadequate sanitary management practices, indiscriminate use of antimicrobials in herds, and surveillance failures can have transnational repercussions.

In the context of emerging diseases, it is observed that more than 60% of infectious agents affecting humans have a zoonotic origin, which reinforces the need for integrated surveillance programs (JONES et al., 2008). Recent epidemics, such as avian influenza and coronavirus outbreaks, have demonstrated the potential of zoonoses to generate health, social, and economic crises on a global scale (ALEXANDER, 2007).

The adoption of biosecurity measures on rural properties is equally indispensable, reducing the entry and spread of infectious agents. Proper waste management, quarantine of newly acquired animals, and maintenance of good hygiene practices in production are fundamental to ensuring public health (OIE, 2018).

Another crucial point is health education, which proves to be one of the most effective instruments for prevention. Campaigns that address responsible pet ownership, rabies vaccination, and simple food hygiene measures are capable of significantly reducing the incidence of diseases (SANTOS; OLIVEIRA, 2021).

From an economic standpoint, zoonoses are estimated to cause billions of dollars in annual losses, both due to animal mortality and decreased productivity, as well as hospital costs and reduced international trade in animal products (WORLD BANK, 2012). Therefore, prevention and control should not be considered merely investments in health, but also strategies for sustainable development.

In summary, the integrated approach proposed by the *One Health concept* represents not only a health necessity, but also a strategic requirement in the face of globalization, climate change, and increased interactions between humans, animals, and the environment. International cooperation, coupled with effective public policies, constitutes the most promising path to reducing the impacts of zoonoses on public health and the global economy.

IV. CONCLUSION

Zoonoses pose a global challenge, affecting both humans and animals. Understanding etiological agents, transmission routes, clinical manifestations, and socioeconomic impacts is fundamental for the development of effective prevention policies. An interdisciplinary approach, based on the One Health concept, is essential to reduce the incidence of these diseases, protect public health, and promote animal welfare.

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