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# Emerging zoonotic bacterial pathogens: Risks and preventive strategies.

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## Introduction

Zoonotic diseases—those transmitted from animals to humans—have long posed significant threats to public health. While viral zoonoses like COVID-19 and Ebola often dominate headlines, bacterial zoonotic pathogens are equally dangerous and frequently overlooked. Emerging zoonotic bacterial infections are increasingly recognized as contributors to global disease burden, especially in regions with close human-animal interactions, inadequate surveillance, and limited healthcare infrastructure. Understanding the risks and implementing preventive strategies is essential to mitigate future outbreaks and protect both human and animal populations [1].

Zoonotic bacterial pathogens originate in animals and can infect humans through direct contact, consumption of contaminated animal products, or exposure to vectors such as ticks and fleas. These pathogens often reside in wildlife, livestock, or companion animals and may remain undetected until they cause human illness [2].

Causes brucellosis, transmitted through unpasteurized dairy or contact with infected livestock. Responsible for leptospirosis, spread via water contaminated with urine from infected animals. Causes Q fever, often contracted through inhalation of contaminated aerosols from livestock. Associated with cat scratch disease and trench fever, transmitted by fleas or scratches. Causes tularemia, transmitted via ticks, deer flies, or handling infected animals. Common foodborne pathogens linked to poultry and livestock. Encroachment into wildlife habitats increases human exposure to novel pathogens [3].

Movement of animals and animal products facilitates cross-border transmission. Alters ecosystems and vector distribution, expanding the range of zoonotic bacteria. Promotes resistance in bacterial strains that can infect humans. High-density livestock operations create environments conducive to bacterial spread. Brucellosis and leptospirosis have caused significant outbreaks in Asia, Africa, and Latin America. Zoonotic bacteria often carry resistance genes, complicating treatment and increasing mortality [4].

The One Health framework emphasizes collaboration across human, animal, and environmental health sectors. It promotes integrated surveillance, joint outbreak response, and shared research initiatives. Access to clean water, proper waste disposal, and handwashing facilities reduces transmission of waterborne and foodborne zoonotic bacteria. These practices are vital to prevent infections like salmonellosis and campylobacteriosis. Vaccinating livestock against brucellosis, leptospirosis, and other bacterial diseases reduces transmission to humans and improves animal health. Managing tick and flea populations through insecticides, habitat modification, and protective clothing helps prevent diseases like tularemia and Bartonella infections. Livestock losses, trade restrictions, and healthcare costs burden economies, especially in low-income countries., veterinarians, and slaughterhouse workers face elevated risks of exposure. Many cases go undiagnosed due to lack of awareness or diagnostic capacity. Especially in rural and resource-poor settings. Monitoring pathogens in wild animals is logistically complex and costly. Fragmented communication between human health,

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veterinary, and environmental sectors delays response [5].

## Conclusion

Emerging zoonotic bacterial pathogens represent a growing threat to global health, driven by environmental change, human behavior, and agricultural practices. Preventing their spread requires a holistic, interdisciplinary approach that integrates surveillance, education, and policy. By investing in One Health strategies and strengthening public health infrastructure, nations can reduce the risk of zoonotic outbreaks and safeguard both human and animal populations. Training farmers, veterinarians, and the public about zoonotic risks and preventive measures fosters safer interactions with animals. Regulating antibiotic use in agriculture and promoting responsible prescribing in human medicine curbs resistance and preserves treatment efficacy. Surveillance of wildlife reservoirs can provide early warning of emerging threats and inform targeted interventions. Despite being endemic, brucellosis remains underdiagnosed. Recent government initiatives aim to vaccinate livestock and improve diagnostic capacity. Seasonal outbreaks linked to flooding have prompted public health campaigns focused on sanitation and rodent control. A large outbreak between 2007–2010 led to enhanced surveillance and mandatory vaccination of dairy goats.

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