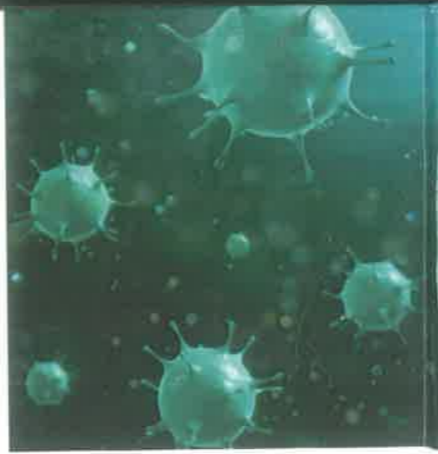


# Emerging & Re-emerging Zoonoses



Zoonotic diseases represent one of the leading causes of illness and death from infectious disease. Defined by the World Health Organization, zoonoses are "those diseases and infections that are naturally transmitted between vertebrate animals and man." An emerging zoonotic disease is defined as a new infection or the occurrence of a previously unrecognized infection or disease.

A re-emerging disease is considered an already known disease that either shifts its geographical setting or expands its host range, or significantly increases its prevalence. Worldwide, zoonotic diseases have a negative impact on commerce, travel, and economies. In most developing countries, these are among those diseases that contribute significantly to an already overly burdened public health system.

In an effort to increase knowledge and understanding of emerging and re-emerging zoonotic diseases with current and probable future public health significance, this book is made available to the readers. The book deals with almost all the major emerging zoonoses. Great emphasis has been given on causal factors, epidemiology, methods of rapid diagnosis, one health approach in control and prevention as well as recommendations for people at health risk. Major factors for emergence of zoonoses have been amply described and future steps to be taken regarding these diseases have been suggested. The editors earnestly believe that the book will prove to be a unique resource for students to study advance aspects of zoonoses and will also be useful for veterinary and public health institutions and other professionals.

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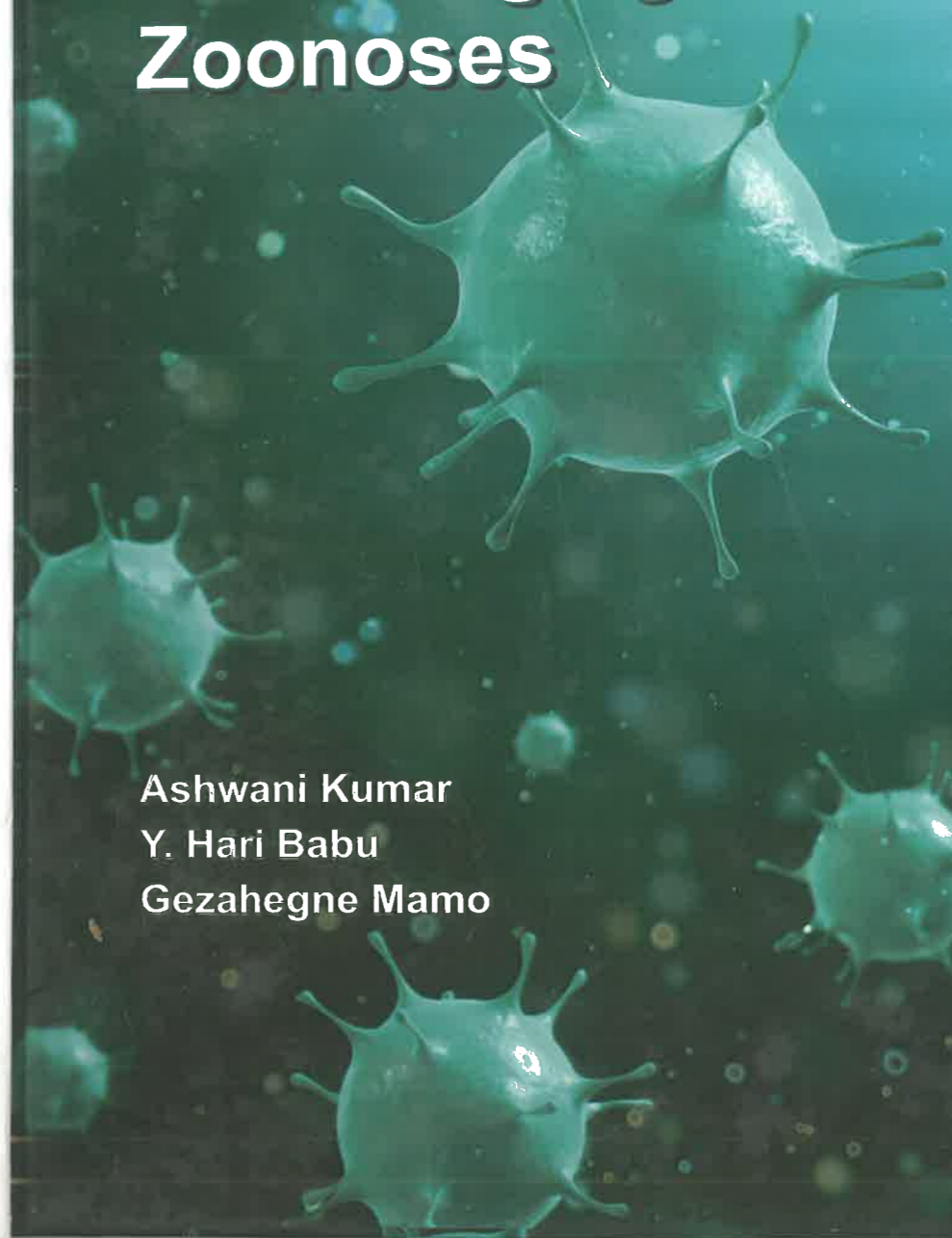
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Ashwani Kumar Y. Hari Babu Gezahegne Mamo

# Emerging & Re-emerging Zoonoses

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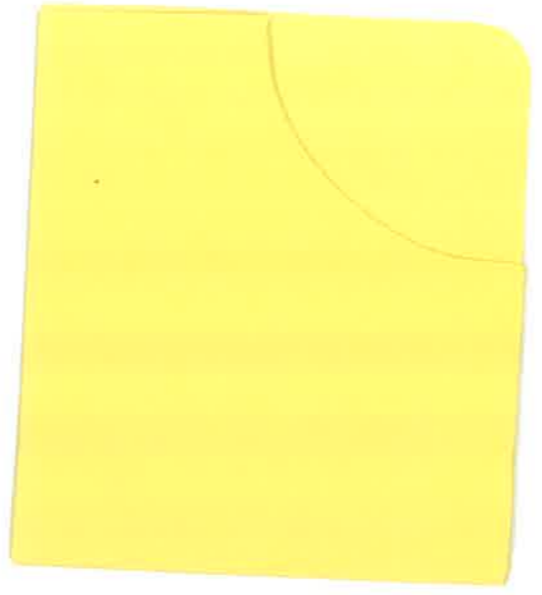


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# Emerging and Re-emerging Zoonoses

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## Preface

Zoonoses are defined as 'diseases and infections which are transmitted naturally between vertebrate animals and man. They are widely prevalent around the world. It is estimated that zoonoses are responsible for 2.5 billion cases of human illnesses and 2.7 million human deaths worldwide each year. A survey of infectious organisms which showed that, of the 1415 species known to be pathogenic to humans, 61% (868) are zoonotic, while 75% of these zoonotic diseases are considered to be 'emerging'. An emerging zoonotic disease is defined as a new infection or the occurrence of a previously unrecognized infection or disease. Few of many examples of emerging zoonoses in the modern world are Ebola virus disease, Middle East Respiratory Syndrome (MERS), avian influenza, HIV/AIDS, severe acute respiratory syndrome (SARS), each of these diseases has caused societal and economic impact related to illnesses and deaths. A re-emerging disease is considered an already known disease that either shifts its geographical setting or expands its host range, or significantly increases its prevalence. Most of the important re-emerging infectious disease agents first appeared long ago, but have survived and persisted by adopting to changing human populations and to environments that have been altered by humans. Dengue, West Nile virus disease, dog rabies virus diseases are some of the good examples of re-emerging zoonotic diseases.

In most developing countries, zoonotic diseases are among those diseases of major public health significance and contribute significantly to an already overlay burdened public health system. Every year millions of people get sick because of foodborne zoonoses, such as Salmonellosis, verotoxigenic *Escherichia coli*, Cysticercosis/Taeniasis, hydatidosis, toxoplasmosis, leishmaniasis, Rabies, Ebola and Rift Valley fever. Besides apart from mortality and morbidity, zoonoses are responsible for huge economic losses, particularly in dairy animals, meat, milk and other foods and products of animal origin. Also these diseases have a negative impact on commerce, travel, and economies.

The main activities against zoonoses are diagnosis, surveillance, epidemiology, control, prevention and their elimination. As compared to eradication of certain infectious diseases like small pox, rinderpest, polio, it seems difficult to eliminate most of the emerging zoonoses in near future. Prevention and control of zoonoses are, therefore, alternative approaches to protect the health of public and to reduce the economic losses. Success in the prevention and control of major zoonoses depends on the capability to mobilize resources in different sectors and on



coordination and intersectoral approaches, especially between national (or international) veterinary and public health services.

Three key factors in respect of emerging zoonoses are early recognition, prompt reporting and adequate management. Awareness for early recognition and prevention and control of zoonotic diseases at public health level are important to prepare and respond during zoonotic disease outbreaks. International organizations like WHO, FAO, OIE are playing key roles in this regard. WHO strengthen the surveillance of and response to all communicable diseases which are or may emerge as public health threats. In collaboration with its Regional Offices, WHO supports Member States in the surveillance and containment in humans and animals of zoonoses and foodborne zoonotic diseases of public health importance, and animal diseases with known or potential public health implications. WHO has been closely linked with various aspects of the work of the Food and Agriculture Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE) in relation to zoonoses, food safety, and the public health aspects of trade in animals and animal products. There is also much collaboration with WHO collaborating centers, other universities, research centers and institutions. The discipline of Veterinary Public Health (VPH) contribute to WHO to strengthen the surveillance of and response to all emerging communicable diseases. VPH activities are currently implemented by WHO Headquarters through the Department of Communicable Diseases Control, Prevention and Eradication (CPE) in close collaboration with the Food Safety programme.

In an effort to increase knowledge and understanding of emerging and re-emerging zoonotic diseases with current and probable future public health significance, this book is made available to the readers. The book emphasizes on epidemiology, rapid diagnosis, one health approach in prevention and control as well as recommendations for people at health risk and has included almost all the important emerging zoonoses. The editors believe that the compiled information in the form of this book will serve as a valuable document to public health professionals as well as for students in various veterinary and public health institutions and universities.

Dr. Ashwani Kumar  
Dr. Y. Hari Babu  
Dr. Gezahegne Mamo

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## Emergence and Re-emergence of Zoonoses and Risk Factors

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### ABSTRACT

Emerging zoonotic agents are those that are newly recognized or newly evolved from an existing one affecting a previously unexposed geographical area. Extensive epidemics of zoonoses are not uncommon, especially as they are often not recognized as zoonotic at first and may spread undetected for some time. Their emergence is driven largely by socio-economic, environmental, and ecological factors, but no comparative study has clearly analyzed these linkages to understand global, temporal, and spatial patterns. Understanding the factors that influence emergence as a whole is very important in the procedure of control and prevention of outbreaks caused by such agents. To developing countries, losses contracted from outbreaks of emerging zoonotic infections, especially viruses would be highly devastating making it difficult to gain their economic, social, and political status prior to the occurrences. It is, therefore, highly cost-effective to be aware of the presence of these risk factors and increase surveillances for early detection to avoid emerging outbreaks of zoonoses rather than being anxious when they turn up.

**Key words:** Emerging, Zoonoses, Factors of emergence

Zoonoses are defined by the World Health Organisation as 'diseases and infections which are transmitted naturally between vertebrate animals and man and *vice-versa*' (WHO, <http://www.who.int/topics/zoonoses/en/>). The importance of zoonotic diseases is well demonstrated by a survey of infectious organisms which showed that, of the 1415 species known to be pathogenic to humans, 61% (868) are zoonotic, while 75% of diseases considered to be 'emerging' are also zoonotic.