

# Overview of Zoonotic Diseases in Peri-Urban Areas and Introduction to the Special Issue

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## Abstract

Emerging zoonoses are the product of socio economic and anthropogenic environmental changes. As human societies continue to develop, pathogens from animal hosts have continued to spill over into our population. However, Peri-urban ecosystems remain neglected in the country. With a subsequent increase in demand for food, there has been an expansion of formal and informal livestock-based food production sectors in these areas. The increasing close contact between animals and humans in both work and living environments creates hot spots in peri-urban areas, thereby increasing vulnerability to zoonotic disease transmission and other health hazards associated with food safety, water, and sanitation-related diseases. This paper explores the efforts made by different research bodies to reduce the prevalence of zoonotic diseases in peri-urban areas.

**Keywords:** Healthy livestock, peri-urban, risk factors, zoonosis

## BACKGROUND

Zoonotic diseases have had a substantial effect on our social, cultural, and economic development. When these diseases first began to emerge is unknown,<sup>[1]</sup> but causal factors include large-scale ecological and demographic changes, such as the domestication of livestock<sup>[2]</sup> and the formation of dense human populations around 10,000 years ago.<sup>[3]</sup> As human societies continue to develop, pathogens from animal hosts have continued to spill over into our population. Roadmap to Combat Zoonoses in India Initiative by Public Health Foundation of India in collaboration with International Livestock Research Institute established a research capacity building program for young researchers under the India Research Initiative on Peri-Urban Human-Animal-Environment Interface (PERIMILK study) with funding support from the International Development Research Centre, Canada. The goal of the PERIMILK study was to contribute to a stronger evidence-based cross-sector policy and local capacity for integrating public health, animal/livestock health, urban planning, local food production, and social development in peri-urban settings of India.

Within the PERIMILK study, the Research Capacity Building Program aimed at providing a platform for young researchers

to explore an Ecohealth approach to research related to local healthy food production, healthy livestock, and prevention and control of zoonotic diseases. The Research Program aims to promote original research studies to develop and improve the understanding of interactions between livestock-rearing practices and epidemiology of diseases associated with the same transmission dynamics and its implications on human health, animal health, and environment with a perspective to promote health, livelihood, and sustainable development in different types of peri-urban settings of the country.

## WHY PERI-URBAN AREAS?

Peri-urban areas on the fringes of cities have witnessed rapid and unsystematic growth in recent years. With a subsequent increase in demand for food, there has been an expansion of formal and informal livestock-based food production sectors in these areas. These livestock-based sectors are now important

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contributors to food and national security of India forming a link between agriculture and high-density populations.

However, peri-urban ecosystems remain neglected in the country. For example, smallholder dairy farming, typical of these ecosystems, suffers from the lack of support and quality control of dairy farming as well as the absence of an organized system of farm inspection or screening of animals for disease. The increasing close contact between animals and humans in both work and living environments creates hot spots in peri-urban areas, thereby increasing vulnerability to zoonotic disease transmission and other health hazards associated with food safety, water, and sanitation-related diseases. In addition, a high consumer demand for local and affordable food, lax food safety measures, inappropriate practices such as overuse of veterinary antibiotics, and low level of awareness and knowledge of disease transmission risks among farmers and consumers contribute to significant public health risks. This occupational human–animal interface poses tremendous risks to workers, animals, as well to peri-urban communities, in addition to productivity and local economies.

The peri-urban ecosystem thus provides a suitable environment to tackle the challenges of zoonotic diseases and promoting synergies between health, environment protection, and development.

### **SMALLHOLDER DAIRY FARMING AND AGRICULTURAL INTENSIFICATION**

The livestock sector in India is growing at a rate of 4.6% annually. Over 80% of this sector is being governed by small-scale farmers operating in informal marketing conditions and their functioning in close proximity to animals.

Peri-urban smallholder dairy farming practices in India are a reflection of traditional agricultural practices being supplemented by highly intensified, industrial-style production units in response to the food security challenges of a large and rapidly growing country.

### **INTRODUCTION OF THE ARTICLES OF THE SPECIAL ISSUE**

There are nine articles in the special issue of the journal which are focusing on different aspects of zoonotic diseases such as risk factors, knowledge, attitude, and practice (KAP) study, management of sick and dying cattle, fate of small-scale dairy farmers, hygienic milk production practices, and gender role. A brief summary of each of the nine articles is mentioned below.

#### **Risk factors of brucellosis**

One of the articles focused on identifying potential risk factors of brucellosis in dairy farmers of the peri-urban area of Southwest Delhi. The study concluded that animal husbandry practices such as keeping animals in close proximity of humans during sleep, irregular vaccination of cattle, contact of animals with other animals during grazing

or watering, treating animals on their own when they fall sick, and assistance during reproduction without wearing protective gloves are contributing to risk of brucellosis among the communities. Dietary practices such as consumption of raw milk are contributing to the risk of brucellosis among the communities.

#### **Knowledge, attitude, and practice study on hygiene among livestock keepers**

One of the articles highlights KAP about hygiene among livestock keepers in peri-urban area of Vadodara District, Gujarat, which concluded that livestock keepers were aware about disease transmission from animal to animal, but they have poor knowledge about disease transmission from animal to human. Similarly, another interesting article with respect to gender was focused on knowledge about hygiene practices among rural female livestock keepers. It was observed that the females correctly answered the questions but did not follow while actual practicing it with livestock. This gap may be due to ignorance and thoughts like nothing happened over generations in the family.

#### **Management of sick and dying cattles and fate of dairy farming**

Two qualitative articles highlighted the management of sick and dying cattle by small dairy farmers and another one was focused on the scope of small scale dairy farming in the present scenario. The study on management of sick and dying cattle gives an understanding to help policy-makers improve animal welfare by modeling guidelines for disposal of dead cattle and its consequences pertaining to zoonoses. Another study concluded that shrinking fringes have eaten up the grazing land, forcing stall feeding and fodder price growing steeply high. With all these, new generation of youth does not want to soil their hands in cattle raising.

#### **Hygienic milk production practices**

An interesting article on the assessment of hygienic milking practices and prevalence of bovine mastitis in small dairy farms of peri-urban area of Jaipur concluded that hygiene practices are of substandard among the suppliers and the distributors, thereby increasing risk of prevalence of bovine mastitis.

It is also necessary to understand the hygienic milk production practices among dairy farm workers and it was covered by one of the articles which reported 100% milking practice by hands. The study revealed that variables such as age, experience, and socioeconomic status hold an insignificant relationship with the knowledge level of dairy farmers.

#### **Community acceptance of available milk and assessment of its quality**

An article was carried out to understand the perception of community regarding the acceptance of packaged and unpackaged milk, assess the quality of milk with respect to adulterants, and assess the difference in quality of milk at the level of vendor/hawker and end user. Conclusion of the study

was that community perceives good taste as traits of good quality milk followed by good smell, easily digestible, pearly white color, and economically cheap.

The India Research Initiative together with the research capacity building program has addressed practical and important needs on zoonoses and public health within the country.

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#### **Conflicts of interest**

There are no conflicts of interest.

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