

Urban zoonoses project

Urban epidemiology, ecology and socio-economics of disease emergence in Nairobi



With a significant award from the Medical Research Council (UK)-coordinated program on the Environmental and Social Ecology of Human Infectious Diseases Initiative (ESEI), itself funded through the UK Government's Living With Environmental Change Initiative, ILRI and partners are undertaking a research program on the 'Epidemiology, ecology and socio-economics of disease emergence in Nairobi.'

The research is focused around the important question of pathogen emergence and the role of urbanization in the emergence of zoonotic pathogens.

A combination of growth and migration is resulting in massive increases in the population of urban and peri-urban (UPU) zones in Africa. The United Nations has estimated that city populations in Africa will rise from 35% of the total population in 2007 to 51% by 2030. The impacts of this on human welfare, healthcare, sanitation, and other policy-orientated fields has received vast attention, but there has not been a substantive effort to integrate across disciplines, particularly with regard to the impacts of these diverse issues on disease transmission.

Objectives

To understand mechanisms leading to the introduction of pathogens into urban populations through livestock commodity value chains and their subsequent spread.

The focus is on livestock as sources of these pathogens, because emerging diseases are likely to be zoonotic in origin, and livestock pathogens, through the close interactions between livestock, their products and people, are at high of risk crossing the species barrier.

The focus in this project is on *Escherichia coli*, as an exemplar of many potential emerging pathogens, which exists in a diversity of hosts, in the environment, on food, in waste etc.

The geographical focus is the city of Nairobi, Kenya and its hinterlands. In the microbiology components, the project takes a landscape genetics approach to understanding *E. coli* distribution and spread, with a view to understanding how this is affected by environmental and socio-economic factors. The project includes a public health component investigating the aetiology of diarrhoea in children in low-income settlements, centred on the Korogocho and Viwandani slums, part of the Nairobi Urban Health Demographic Surveillance System.

Research questions

The project's broad set of questions includes:

- Does urban livestock keeping predispose people to acquire new or more diverse microbial flora?
- Is the risk compounded by poverty status or other social factors?
- How is the microbial flora influenced by the keeping of livestock in these areas?
- Do supply chains for livestock and livestock products bring people into contact with microbial diversity over and above what they would otherwise experience?
- Why do people source food from particular places? What social and economic factors define food sourcing in a complex city?
- What influences the microbial flora to which people are exposed through food?
- How does the design of complex urban environments influence exposure to microbial flora?

- How has the city of Nairobi grown, how does it continue to grow, and how does urbanization in the region affect exposure to microbial diversity in the human and animal population?
- What is the role of per-domestic wildlife in transmission of zoonotic pathogens and the transport of microbial flora?
- Why do supply chains exist in the way that they do, and how might they change as demand for products changes with urban growth, or as a consequence of legislation?

The findings will inform development of policy on urban livestock keeping by improving knowledge of the public health risks and by putting those risks in a wider socio-economic context, including the risks associated with alternative sources of livestock products.

Project partners

- Institute of Infection and Global Health at the University of Liverpool
- Centre for Immunity, Infection and Evolution at the University of Edinburgh.
- Development Planning Unit at University College London.
- Royal Veterinary College, University of London.
- International Institute for Environment and Development (IIED).
- University of Nairobi.
- International Livestock Research Institute.
- Kenya Medical Research Institute.
- The African Population and Health Research Center.
- The Food and Agriculture Organization of the United Nations (FAO).
- The Roslin Institute.
- The Wellcome Trust Sanger Institute.

Photo credits

Page 1: ILRI/Paul Karaimu

Contact

Eric Fèvre
University of Liverpool and ILRI, Kenya
Eric.Fevre@liverpool.ac.uk
www.zoonotic-diseases.org



RESEARCH
PROGRAM ON
Agriculture for
Nutrition
and Health

ILRI
INTERNATIONAL
LIVESTOCK RESEARCH
INSTITUTE

MRC | Medical
Research
Council

E·S·R·C
ECONOMIC
& SOCIAL
RESEARCH
COUNCIL



NERC | SCIENCE OF THE
ENVIRONMENT

ilri.org

better lives through livestock

ILRI is a member of the CGIAR Consortium

Box 30709, Nairobi 00100, Kenya
Phone: + 254 20 422 3000
Fax: +254 20 422 3001
Email: ILRI-Kenya@cgiar.org

Box 5689, Addis Ababa, Ethiopia
Phone: +251 11 617 2000
Fax: +251 11 617 2001
Email: ILRI-Ethiopia@cgiar.org



This document is licensed for use under a Creative Commons Attribution-Noncommercial-ShareAlike 3.0 Unported License.

May 2015