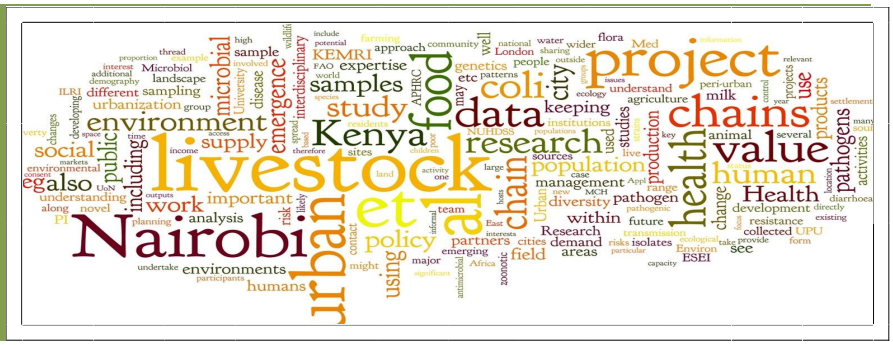
VOLUME 2, ISSUE 3

# The "URBAN ZOO" Newsletter




MAY,2015

*Quarterly Newsletter on "Epidemiology, Ecology and Socio-Economics of Disease Emergence in Nairobi"*

## Co PI's Letter: The 99 Household Study

Dr. Tim Robinson

A very warm welcome to the 7th edition of the Urban Zoo Newsletter. Two key objectives of the Urban Zoo project are to **explore the genetic diversity of *Escherichia coli*** within Nairobi city and **to explore the links between microbial diversity and urban livestock.** This is at the core of the "99 household" study.

Choosing 99 households, within 33 sub-locations in Nairobi, has been challenging. It has also been the subject of heated debate during our Urban Zoo annual meetings. The issues have been around finding a suitable balance between the practicalities of including a diverse range of geographical locations, wealth categories and livestock ownership whilst at the same time avoiding unnecessary biases in the selection of households. The protocol for household selection has now been finalized and sampling will start soon.

One of the key variables that we needed to take account of is wealth and to this end we explored many options for data layers that could provide an indicator of socio-economic diversity. The best option appeared to be a study focusing on water availability and distribution in Nairobi. It was funded by UN-HABITAT and the Global Water Operators' Partnerships Alliance (GWOPA), and implemented by the Institut Français de Recherche en Afrique (IFRA). (http://access-to-water-in-nairobi.gwopa.org/). This study categorised all residential areas of Nairobi into 17 neighbourhood typologies, and estimated income levels for each. We purposefully selected 33 sub-locations, ensuring a good geographical spread across the city and covering the range of neighbourhood typologies in the city.

In each of the selected sub-locations three households are to be selected based on their proximity to three randomly chosen points within the dominant neighbourhood typology for that sub-location. Taking advantage of local knowledge, each of these points is assigned a category of livestock ownership: no livestock, monogastric production (pigs or poultry), or ruminant production (cattle, sheep or goats). These points are then plotted on a Google maps (Quickbird) image of the sub-location to aid the search on the ground for the closest household falling into the designated livestock husbandry category. A questionnaire will be administered at each of the households to establish wealth level, livestock husbandry activities and sources of animal-source foods and biological samples will be taken from the household members, from the household itself and from its immediate environment. Samples will be sent for genetic analysis of *E. coli* and will contribute to estimating genetic diversity across the city.

Considerable discussion has also been had around the level of detail to capture in the questionnaires. We have opted to collect relatively little information from the 99 households and instead focus on the sampling of *E. coli*. We will conduct a separate survey, based on the same neighbourhood typologies and sub-locations but covering many more households, to explore the links between wealth, consumption patterns (with a focus on animal-source foods), livestock husbandry and nutritional status.

Dr Judy Bettridge who has just joined the project as a University of Liverpool postdoc and will be a visiting scientist at ILRI for the coming year or so will be taking a leading role in ensuring the smooth implementation of these 99HH surveys.

***Timothy Robinson is a principal scientist with ILRI's Livestock Systems and Environment research group.***

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## Middle East Respiratory Syndrome Corona Virus (MERS-CoV) - What do we know?




In the summer of 2012 in Saudi Arabia a strange corona virus infection was isolated from a patient with acute pneumonia and renal failure. Subsequently, a series of laboratory diagnostics divulged a novel coronavirus later known as Middle East Respiratory Syndrome Coronavirus (MERS COV).

Following the virus identification, a new case was reported from a Qatar patient in the UK and a cluster of hospital cases were reported among health workers in Zarqa, Jordan. There was ineffable fear that the world was fronting another pandemic after the Severe Acute Respiratory Syndrome (SARS).

*MERS-CoV worldwide distribution*

As of June 3rd 2015, there have been 1,179 confirmed cases of MERS and 442 fatalities in 25 nations representing a case fatality rate of 37.49%. South Korea is the latest country to report two deaths and 35 cases in the largest outbreak outside Saudi Arabia. The vast majority of the South Korean cases have been acquired from hospitals with the fast spread attributed to the fact that family members often stay with patients in their hospital rooms.

MERS-CoV infection in humans occurs either as outbreaks as witnessed in Jeddah, Saudi Arabia where 255 confirmed cases were reported in four months or as isolated cases. The infection's clinical presentation ranges from asymptomatic to a very severe pneumonia with the acute respiratory distress syndrome, septic shock and multi-organ failure ensuing in death.

Serological studies have confirmed camels have antibodies against the virus. In addition, virus detection by reverse transcription PCR and sequencing has confirmed that these antibodies are likely to be caused by infection with a similar virus strains that infect humans, although a formal confirmation of the role of camels in the epidemiology of the virus is still elusive. Transmission has largely remained human to human with a few isolated primary cases having a history of contact with camels, suggesting that they are a source of human infection.

A number of questions regarding the disease have remained difficult to answer:

1. What is the reservoir of the virus, and are there multiple animal species that may form a reservoir community? If yes, which ones?
2. The infection has predominantly affected older people. Is this related to ability to fight infection, or is it exposure related?
3. The evolutionary background of MERS-CoV is unclear; antibodies against the virus were found in Kenyan camels during a period spanning from 1992 to 2013. This implies that the virus existed in camels long before it was identified and before it jumped to the human population. Nevertheless, the appearance of human cases in the last few years might indicate some kind of mutation of virus that allows it be become human infective. If this is the case, could it spread rapidly though the human population? If this mutation has occurred, has it occurred in multiple locations simultaneously?
4. What is the risk of human infection from camel populations outside the Middle East (eg in Kenya)

In collaboration with a number of partners, including St Louis Zoo, the Mpala Research Center and the Erasmus Medical University, we are investigating elements of the epidemiology of MERS-CoV in camels in Kenya to help answer some of the above questions.

These studies are an extension of the Urban Zoo project's activities investigating camel value chains in Kenya and Nairobi.

*Written by Dishon Muloi (dshnmuloi@gmail.com)*

Coronaviruses are a large family of viruses that cause a range of illnesses in humans, from the common cold to the Severe Acute Respiratory Syndrome (SARS).

## Bettridge joins Urban Zoo Project……

Dr. Judy Bettridge

**Dr. Judy Bettridge** is a Veterinarian and currently a post-doctoral research associate at the University of Liverpool, based at the International Livestock Research Institute in Nairobi, Kenya. She recently joined the Urban Zoo project with role of focusing on the 99 households component of the project; a cross-cutting study which integrates multiple project threads. This will contribute to the understanding of factors influencing public health risk from emerging zoonotic pathogens in an urbanised environment and the role of livestock keeping and contact with value chains in driving disease emergence. More info about her to be found http://www.zoonotic-diseases.org/who-we-are/currentstaffstudents/dr-judy-bettridge/




Kenya's urban poor federation *Muungano wa Wanavijiji* is working with food vendors in informal settlements to reveal their challenges and explore how to promote food security. Muungano is a member of Slum Dwellers International (SDI), a network that aims to improve shelter, services, and government responsiveness to the urban poor. The ongoing project is complementing other Urban Zoo activities, as well as building upon Muungano's past experience with grassroots data-collection and advocacy. Working alongside Muungano are community residents, pro-poor financial analysts at Akiba Mashinani Trust (Muungano's financial wing), and researchers at University College London and UC Berkeley.

Community-led balloon mapping of food vendors

This action-research project is utilising participatory methods to understand vendors in Nairobi's informal settlements of Korogocho and Viwandani. Vendors sell a variety of items in these settlements such as fresh produce; meat, fish, and eggs; cooked and uncooked foods; beverages; and snacks. A mobile phone application is capturing vendors' demographic and business profile, while base-maps and balloon-mapping (low-cost aerial photography with balloons and a simple camera) are generating detailed spatial data on their locations. Finally, focus group discussions (FGDs) are delving into traders' constraints, coping strategies, and priorities for change.

These vendors are poorly organised and frequently overlooked or stigmatised by policy-makers, yet vending is a vital source of affordable, accessible foods and a key income-generating activity. Customers may appreciate the convenience and their personal relations with traders; food vending is also a widespread livelihood strategy, particularly for female traders seeking to combine work with childcare. As a female vendor explained in a Viwandani FGD, "I'll be doing my work and also doing the house chores and also look after my kids…But if you are outside [the settlement], sometimes you have to look for someone to take care of your kids and sometimes you don't have that money."


Cooking place next to an open sewer

However, vendors often face multiple challenges in their settlements like overflowing drains, minimal water and sanitation, uncollected rubbish, and elevated insecurity. In turn, widespread hazards and poor infrastructure or services can threaten food security by jeopardising vendors' livelihoods and customers' access to food. But the project's maps and FGDs are uncovering these concerns and, moreover, a Food Vendors' Association (FVA) has been established to increase their collective strength, amplify their voices, and advocate for much-needed interventions in the future.

This action-research project is utilising participatory methods to understand vendors in Nairobi's informal settlements of Korogocho and Viwandani, with support from APHRC and ILRI team members from the Urban Zoonoses project.

***This article has been written by the Muungano team***

## Launch of the new Zoonotic and Emerging infectious Disease ZED Group Website



We are pleased to announce the launch of the new website, along with a new look, we have included some features that we hope will make visiting the site easier, enjoyable and a more interactive experience. www.zoonotic-diseases.org

### What's new.....

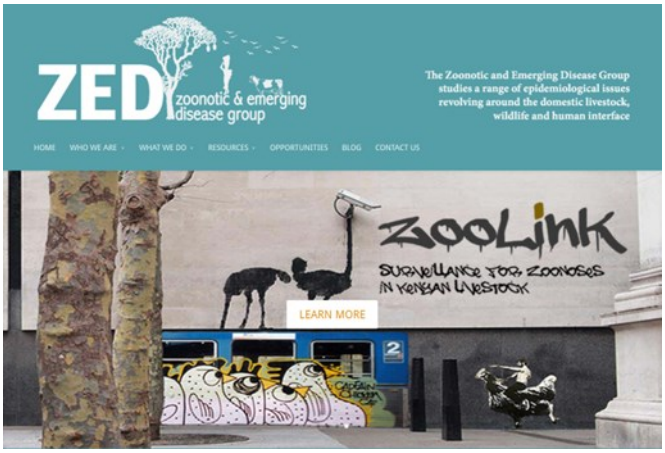
Navigation: easier headliners, great typography and instant social sharing and more focused pictorials

Blog: success stories from our team. These will be updated regularly

Research themes: providing an overview of our key research areas

Flagship projects: providing a detailed record of our past and current projects

IGH blog series: featuring the latest research work from IGH-Liverpool




### Coming soon....

A blog series featuring the work of our other research partners with new case study pictures in our gallery section

### Also look at.....

Our newsletter: You will be the first to find out about any new product offers, package deals or any new innovations-sign up here

Resources section: for a great deal useful learning and research tools

Opportunity section: on how you can work with us

Social networking: Connect with us via Twitter

We are looking forward to hearing your feedback regarding the new website. Any comments/suggestions please contact us (zed-group@zoonotic-diseases.org)

The website was made a success through a great deal of effort by Kelvin Momanyi in close consultation with James Hassell, Eric Fevre, Victoria Kyallo, Nicola Frost and all the ZED group team members through their advice, review and proactive critique. Thank you all.

**Article by:** Momanyi Kelvin

www.zoonotic-diseases.org

## UPCOMING EVENTS:

- WAAVP Conference - Liverpool, 15-20 August, 2015. Key dates: Call for abstracts opens – 8th August 2014; Registration opens - 7th January 2015; Deadline for abstract submission – 1st March 2015; Notification of oral or poster presentation acceptance – 3rd May 2015; Presenting authors registration deadline – 17th May 2015.
- 3rd International Congress on Pathogens at the Human Animal Interface (ICOPHAI) 2015 will be held August 6-8, 2015 in Chiang Mai, Thailand. https://www.conference-service.com/ICOPHAI15/config.cgi
- ISVEE 14 in the City of Merida, Yucatan, Mexico, during 3-7 November 2015. Pre- and post-symposium workshops will be offered during 1-2 and 8-12 November, respectively. The Theme for ISVEE 14 is "Veterinary Epidemiology & Economics: Planning Our Future" http://www.isvee2015.org. Several papers from the urban zoo team have been accepted for oral presentation.

MRC Medical Research Council · BBSRC bioscience for the future · E·S·R·C Economic & Social Research Council · NERC · Living With Environmental Change LWEC