The challenge
Over the past few decades more than 60 per cent of emerging infectious diseases affecting people have had their origin in wildlife or livestock. As well as presenting a threat of global disease outbreak, these zoonotic diseases are quietly devastating lives and livelihoods. At present, zoonoses are poorly understood and under-measured — and therefore under-prioritised in national and international health systems.

A unique partnership
The Dynamic Drivers of Disease in Africa Consortium brings together natural and social scientists in a unique partnership. Taking an integrated approach to understanding zoonoses, our researchers are generating vital new understandings of the relationships between ecosystems, disease and poverty.

Our aim
Our aim is to identify evidence-based opportunities for policy, institutions and interventions which will reduce the risk of zoonoses emergence in ways that ensure ecosystems are sustainably managed and disease regulation balanced with wellbeing.
Our approach

The Drivers of Disease Consortium includes environmental, biological, social, political, and human and animal health researchers. We believe an integrated approach to understanding animal-to-human disease transmission is essential to inform effective poverty and public health interventions.

We need to know under what conditions environmental change, zoonotic disease and poverty can form a downward spiral. There is little systematic understanding of how such downward spirals emerge, and of the thresholds and tipping points for zoonotic ‘spillover’ (the points at which a disease transmits from animal species to people).

Our multidisciplinary country teams, forged as novel government-university/research institute partnerships, are focusing on four zoonotic diseases: Lassa fever, henipavirus infection, trypanosomiasis and Rift Valley fever. These diseases have been chosen because they represent an excellent range and types and people-environment interactions and drivers.

More specifically:

- They represent a range of different transmission routes.
- They exemplify different ecosystem types and people-environment interactions and drivers.
- They involve significant current or potential negative impacts on people’s health and wellbeing.

Where we are working

**SIERRA LEONE**

**Lassa fever**

Forest-savannah transition ecosystem

The Lassa fever virus is found in the rodent species *Mastomys natalensis*. Lassa fever is endemic in West Africa, where there are up to 300,000 cases and 5,000 deaths a year. In Sierra Leone, changing land use and settlement patterns may be increasing transmission from rats with significant impacts in poor farming, peri-urban and mining settlements.

**KENYA**

**Rift Valley fever**

Semi-arid savannah ecosystem

The arbovirus causing Rift Valley fever is transmitted mainly by mosquitoes. Before 1977 it was mostly an animal health problem, but since then, for unclear reasons, people have been increasingly affected. Cyclical outbreaks result in the death of millions of animals and thousands of people and have major impacts on poverty and wellbeing.

**GHANA**

**Henipavirus infection**

Humid forest ecosystem

Henipaviruses, found in bats, can cause often-fatal disease in people. Land use change in Ghana may be affecting the likelihood of virus spillover, perhaps by affecting bat roosting and feeding patterns and thus direct and indirect interactions with people and their livestock. The disease in people may be misreported as the symptoms are similar to those of cerebral malaria.

**ZAMBIAN AND ZAMBIA**

**Trypanosomiasis**

Wooded ‘miombo’ savannah ecosystem

Trypanosomiasis circulates both within wildlife populations and domestic livestock via transmission by the tsetse fly. African animal trypanosomiasis causes severe production losses in livestock, while human African trypanosomiasis causes sleeping sickness in people (fatal if untreated). Its impacts are hugely underestimated, yet it affects the livelihoods of some of the poorest rural communities in Africa and the disease is highly neglected.

“...a core goal of the Drivers of Disease Consortium is to provide examples of how to implement the One Health agenda in ways that can genuinely benefit people’s health and livelihoods in our case study countries – and also provide illustrations to guide thinking elsewhere.”

Key questions

Using exciting new fieldwork and modelling approaches, we are seeking answers to the following questions:

- What kinds of ecological changes (for example biodiversity, vegetation and habitat, and water) affect possible animal-to-human disease transmission?
- How do the different uses of ecosystems bring people into contact with possible disease risk?
- How are these local dynamics affected by wider changes, such as those in climate, land use and urbanisation?
- How do different people and agencies understand and represent these dynamics, and what are the implications for public health policy?

Building evidence for a reason

The Drivers of Disease Consortium aims to provide a much-needed evidence base to inform a holistic approach to zoonoses management and prevention in line with the One Health agenda, which focuses on integrating ecosystem integrity with animal and human health. There are few examples of how to implement the One Health agenda and how to make it work for the poor. A core goal of the Drivers of Disease Consortium is to provide examples of how to implement the One Health agenda in ways that can genuinely benefit people’s health and livelihoods in our case study countries – and also provide illustrations to guide thinking elsewhere.