Emerging infectious diseases pose a significant burden on human and animal health and global economies. Conventional approaches to epidemic control have most often been reactive. However, explosive human population growth, dramatic changes in land use, and increased global trade and travel require a shift toward a proactive, predictive approach. The PREDICT project aims to prevent, detect, and rapidly respond to the spillover of novel infectious pathogens from wildlife to humans.

While the linkage of human, animal, and environmental health is at the heart of our One Health approach – an increasingly important and recognized lens through which governments, NGOs, and practitioners view public health – the global health community still has three critically important needs:

1) Broader and deeper knowledge of pathogens that have the potential to emerge from animals;
2) Targeted surveillance to maximize available resources;
3) Tools to characterize organisms that could be pathogens of significance and to predict where and how they might spillover to susceptible hosts.

Challenge: Develop a strategic framework for identifying pathogens of pandemic potential that have not yet emerged.

Opportunity: Current infrastructure improvements and technological advances have dramatically and rapidly improved our ability to identify high-risk interfaces for disease transmission and to detect novel pathogens before widespread spillover occurs. These advances include improvements in information technology, molecular diagnostics, and risk modeling.

PREDICT has built a broad coalition of partners to discover, detect, and monitor pathogens at the wildlife-human interface using a risk-based approach. Our efforts integrate digital sensing and on-the-ground surveillance at critical points for disease emergence. PREDICT is at the cutting-edge of recent technological advances allowing rapid detection and diagnosis of high-risk viral families, even in settings where resources are limited.
The goal of the PREDICT project in Uganda was to identify emerging infectious diseases in wildlife of high zoonotic disease risk that could pose a threat to human health. PREDICT-Uganda was a collaboration between Gorilla Doctors and the University of California Davis; key partners include Makerere University and the Uganda Wildlife Authority.

Background

In Uganda, opportunities for the emergence of pathogens of wildlife origin that could pose a threat to domestic animal and human health abound. Uganda has a long-standing and well-established network of national parks, which provide protection for wildlife, but are surrounded by intensive animal agriculture and dense human communities. Wildlife exit protected areas to forage in agricultural fields, and people live and enter parks for their livelihoods; this movement results in significant interaction and conflict among wildlife, livestock, and people. Uganda also supports a thriving wildlife ecotourism industry that brings both local and foreign people into daily contact with wildlife that present a high zoonotic disease risk, such as primates and bats.

Disease Surveillance

The PREDICT field team collected samples from wildlife at high-risk disease transmission interfaces, in areas where wildlife are likely to have significant interactions with domestic animals and people.

To test theories regarding how wildlife pathogens emerge in people, PREDICT conducted systematic sampling of wildlife in areas across a gradient of human land use ranging from pristine to urban settings in the Bwindi-Mgahinga Conservation area.

PREDICT introduced a novel, cellphone-based application that helps the Uganda Wildlife Authority report on animal morbidity and mortality events in the Queen Elizabeth National Park Conservation Area. This tool is a vital component of an early warning disease surveillance system.

Disease Outbreak Response

Recent outbreaks, including Ebola, Marburg, yellow fever, anthrax, and Rift Valley fever have labeled Uganda as a global emerging disease “hotspot”. PREDICT Uganda led wildlife surveillance efforts for several major zoonotic disease outbreak investigations, including Ebola virus and yellow fever.
Partnerships for Sustainability

- Makerere University Walter Reed Project Influenza Research Laboratory
- Uganda Wildlife Authority

Making a difference for One Health

PREDICT has supported the Uganda National Task Force for Epidemic Preparedness and Response in its disease outbreak investigations to better understand the role that wildlife may play in disease outbreaks and to learn lessons for prevention, preparedness, and response for the future.

The National Task Force now uses a One Health approach to disease outbreak investigation, control and prevention in Uganda by incorporating wildlife disease investigations into disease outbreak response planning. Implementation of this proactive, integrated approach illustrates the successful application of a collaborative trans-disciplinary One Health approach to outbreak preparedness and response.

Capacity Building

- Installed laboratory equipment and provided support and supplies to enable diagnostic testing of hundreds of wildlife samples for viruses of pandemic potential.
- Trained local veterinarians in wildlife surveillance principles and practice.

Contact:
Dr. Benard Jasper Ssebide
Gorilla Doctors
Wildlife Department, College of Veterinary Medicine
Makerere University
Tel: +256414534061; +256772918413
Email: bssebide@gorilladoctors.org
Local website: www.gorilladoctors.org

More information available at:
Selected PREDICT Publications 2012-2014


