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:

Challenge: Develop a strategic framework to identify 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 Rwanda is to identify emerging zoonotic pathogens at the wildlife-human disease transmission interface that present a potential public health threat in Rwanda and globally. PREDICT Rwanda is a collaboration between Gorilla Doctors and the University of California Davis. The Rwanda Development Board and the Rwanda Agriculture Board are key local implementing partners.

### Background

In Rwanda, continental Africa’s most densely populated country, human encroachment into natural habitats presents unique opportunities for the emergence of pathogens from wildlife that could pose a threat to human health. Bats and rodents live in and around rural peoples’ homes and adjacent subsistence farmlands leading to significant human-wildlife-domestic animal disease transmission interfaces. In addition, a robust wildlife ecotourism industry brings both local people and global tourists into daily contact with primates and bats.

PREDICT is conducting wildlife surveillance in areas where there is a high risk of zoonotic disease spillover from wildlife into domestic animals and people in Rwanda.

### Disease Surveillance and Outbreak Response

- Collected samples from bats, primates, and rodents in areas where wildlife is likely to have significant interactions with domestic animals and people, primarily in and around Rwanda’s national parks and in urban and rural communities.
- Provided wildlife expertise to the Government of Rwanda in its investigations and preparedness planning for human and animal disease outbreaks.
Partnerships for Sustainability

- Rwanda Development Board – Tourism & Conservation
- Rwanda Agriculture Board/Animal Resources Extension
- Rwanda Biomedical Center/Infectious Epidemic Unit
- University of Rwanda - Nyagatare Campus

Capacity Building

- Improved facilities and acquired equipment for the safe and secure transport and storage of biological samples collected from wildlife.
- Established, equipped, and supplied the country’s first BSL2+ molecular laboratory at the Rwanda Agriculture Board in Rubilizi, Kigali for processing hundreds of wildlife samples.
- Partnered with the Makerere University Walter Reed Project to conduct broad-based testing of wildlife samples for viruses of pandemic potential, which led to the detection of both known and previously-unknown pathogens.
- Trained more than 200 veterinary and park personnel, university students and members of the Government’s One Health Steering Committee and outbreak response task forces on wildlife zoonoses.

In Rwanda, a thriving ecotourism industry for viewing primates in the wild brings in much-needed revenue for the country. However, tourism also increases the risk of interspecies transmission of infectious agents between the primates and the thousands of tourists from around the world that come in direct and indirect contact with the primates. PREDICT has focused on this high-risk wildlife-human interface in Rwanda for discovery of viruses that may be transmitted between primates and people.

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