

A Project of USAID's Emerging Pandemic Threats Program

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:

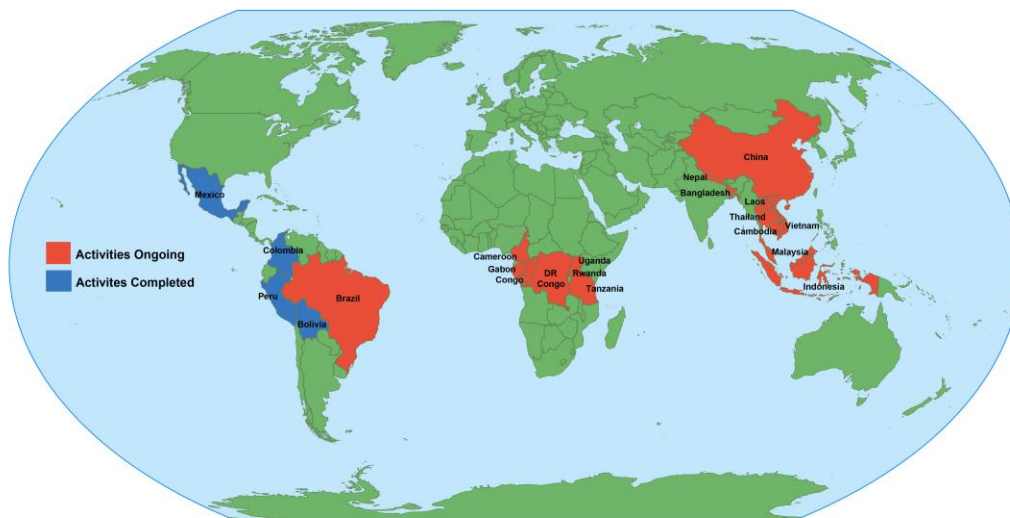
- 1) Broader and deeper knowledge of pathogens with the potential to emerge from animals;
- 2) Targeted surveillance to maximize available resources;
- 3) Tools to characterize organisms that could be pathogens of significance and to predict where and how they might spillover to susceptible hosts.

Challenge: Develop a strategic framework 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**.

PREDICT Countries



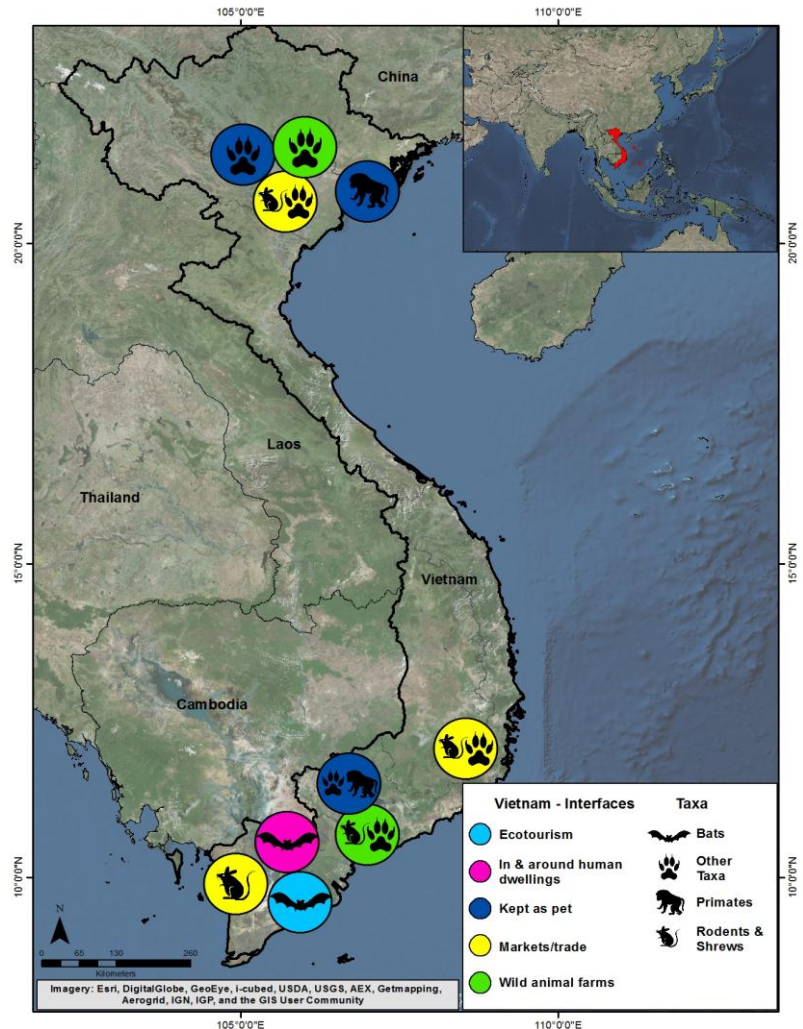
The goal of PREDICT in Vietnam was to strengthen wildlife disease surveillance and diagnostics to protect human and animal health through strategic partnerships with government and research institutions. PREDICT-Vietnam was a collaborative effort of the Department of Animal Health of the Ministry of Agriculture and Rural Development, Hanoi University of Agriculture, and the Wildlife Conservation Society.

Background

More than 60% of infectious diseases are shared between animals and humans, 70% originating in wildlife. Anthropogenic activities, such as the trade and consumption of wildlife, are driving disease emergence. Vietnam is at the epicenter of the wildlife trade in Asia: hunting, farming, and consuming wildlife locally; sourcing wildlife from neighboring countries; and trafficking wildlife across the region. Population growth and economic development have also driven large scale land-use change with human encroachment into natural habitats, intensifying the interfaces among wildlife, domestic animals, and humans and providing ideal opportunities for pathogen spillover from animals to people.

Disease Surveillance

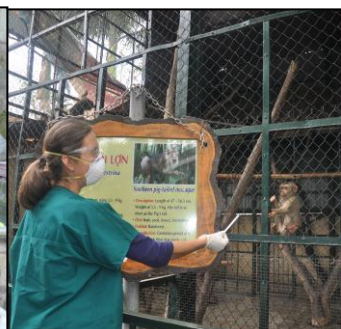
- PREDICT prioritized disease surveillance where the contact between humans and wildlife is most intense.
- Surveillance teams targeted markets and restaurants across the country where wildlife (primarily rodents, carnivores, ungulates, and birds) are sold as food for human consumption.
- Pathogen monitoring was initiated on wildlife farms in priority taxonomic groups (bats, rodents, and non-human primates).



PREDICT characterized zoonotic disease risks at critical animal-human interfaces in Vietnam.



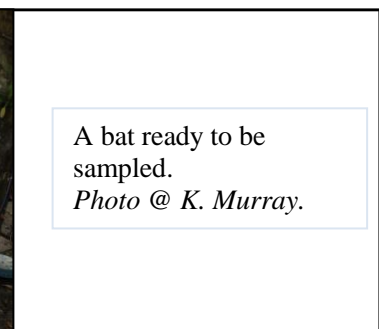
Rats on sale in a wet-market, Dong Thap Province.
Photo by WCS Vietnam.



Collecting saliva samples from captive non-human primates.
Photo by WCS Vietnam.

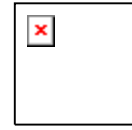


Practicing wildlife sample collection, Wildlife Health Training, Dong Nai Province. Photo by L. Fain.



A bat ready to be sampled.
Photo @ K. Murray.

Collecting samples from wild fruit bats, Soc Trang Province.
Photo by WCS Vietnam.



Dong Nai
Province
Wildlife
Health
Training with
FPD and
DAH.
Photo by WCS
Vietnam.



Bat Guano
Farm in Soc
Trang
Province.
Photo by WCS
Vietnam.



Project Successes

Expanded the One Health Workforce in Vietnam

- Incorporated content on disease risks at the wildlife-human interface into training programs on wildlife law enforcement delivered to over 250 Forest Protection Department (FPD) officers and law enforcement staff in Vietnam.
- Collaborated with the Vietnam One Health University Network (VOHUN) and RESPOND to train provincial and district-level DAH and FPD officers and wildlife farm owners on wildlife health, disease surveillance, and bio-security assessments on wildlife farms.

Optimized Surveillance and Response

- Standardized animal sampling protocols to ensure safe wildlife handling and the bio-safety of surveillance staff.
- Established protocols for sample storage and transport to ensure cold chain and the diagnostic quality of samples.
- Established procedures for the submission of samples from wildlife at national animal health laboratories.

Expanded Zoonotic Diseases Surveillance in Vietnam

- Conducted wildlife surveillance in partnership with the Department of Animal Health (DAH) and FPD of the Ministry of Agriculture and Rural Development (MARD) at high risk wildlife/human interfaces including markets, restaurants, wildlife farms, wildlife rescue centers/sanctuaries, and in and around human dwellings.
- Sampled over **2,054 animals during close to 100 sampling events across Vietnam**, including 1,288 rodents, 366 bats, 42 non-human primates, and 358 animals of other taxa.
- Initiated polymerase chain reaction (PCR) screening for nine viral families (Arena-, Flavi-, Paramyxo-, Hanta-, Bunya-, Corona-, Henipa-, Filo-, and Rhabdoviridae) using novel and cost effective techniques at laboratories in northern (HUA) and southern (RAHO6) Vietnam.

Capacity Building

- Developed local capacities to safely conduct wildlife pathogen surveillance through field-based training with approximately 150 animal health officers.
- Trained 43 technicians from national and university laboratories in wildlife pathology and advanced molecular diagnostics.
- Established viral family testing protocols at the Hanoi University of Agriculture and the Department of Animal Health Regional Animal Health Office No. 6

Partnerships for Sustainability

- Department of Animal Health, Ministry of Agriculture and Rural Development (MARD)
- Regional Animal Health Office No6 (RAHO6), Department of Animal Health (DAH)
- Hanoi University of Agriculture (HUA)
- National Center for Veterinary Diagnostics (NCVD)
- Lam Dong Province Forest Protection Department
- Dong Nai Province Forest Protection Department
- Soc Trang Province Sub-Department of Animal Health
- Dong Thap Province Sub-Department of Animal Health
- The Cat Ba Langur Conservation Project
- Animals Asia Foundation

More information available at:

<http://www.vetmed.ucdavis.edu/ohi/predict/>

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