**PREDICT Talking Points**

**Overall PREDICT-2 Plans**

Going forward, PREDICT will improve the understanding of the dynamics of zoonotic virus spillover, evolution, amplification, and spread to:

1. Forecast risk
2. Inform prevention and control measures
3. Facilitate and optimize policies and practices that reduce disease transmission risk through sound, science-based interventions

**Using an epizonal approach**, PREDICT is targeting surveillance activities at **three major pandemic risk pathways that drive viral emergence:**

* Land conversion for commercialization
* Intensification of animal production systems
* Animal value chains

By standardizing and integrating longitudinal biological, ecological, and behavioral surveillance efforts, **PREDICT aims to characterize the whole geographic, ecological, and sociological space,** from pre-spillover conditions that drive viral evolution, through transmission of zoonoses, to circumstances of pathogen amplification and spread.

**PREDICT will characterize risk and surveil people (including behaviors) and animals in concert** at high-risk interfaces along the disease emergence pathways.

**PREDICT-2 primary activities include:**

* Conducting **standardized, longitudinal surveillance of human and animal populations** to identify biological and ecological drivers and host-pathogen dynamics at high-risk interfaces within the three critical pathways of disease emergence and spread
* **Understanding behavioral mechanisms of human-animal contact** within high-risk pathways for disease emergence and spread **AND identifying potential control points, strategies, and interventions** for pilot testing and policy promotion
* **Developing an evidence base to promote policies** in support of cross-sectoral collaborations and actively engaging partners through data sharing, capacity building, surveillance, and outbreak response activities **to demonstrate the value of the One Health approach**
* **Enhancing capacity** for surveillance; diagnostics; and improved data collection, synthesis, storage, and sharing platforms **to strengthen global surveillance and outbreak response and intelligence systems**

**PREDICT-2 Country Plans**

**Phase-in plans for new PREDICT Countries at Complete Portfolio Level of Engagement (Cote d’Ivoire, Ghana, Guinea, India – West Bengal, Liberia, Philippines, Senegal, Sierra Leone)**

**Initial activities will consist of:**

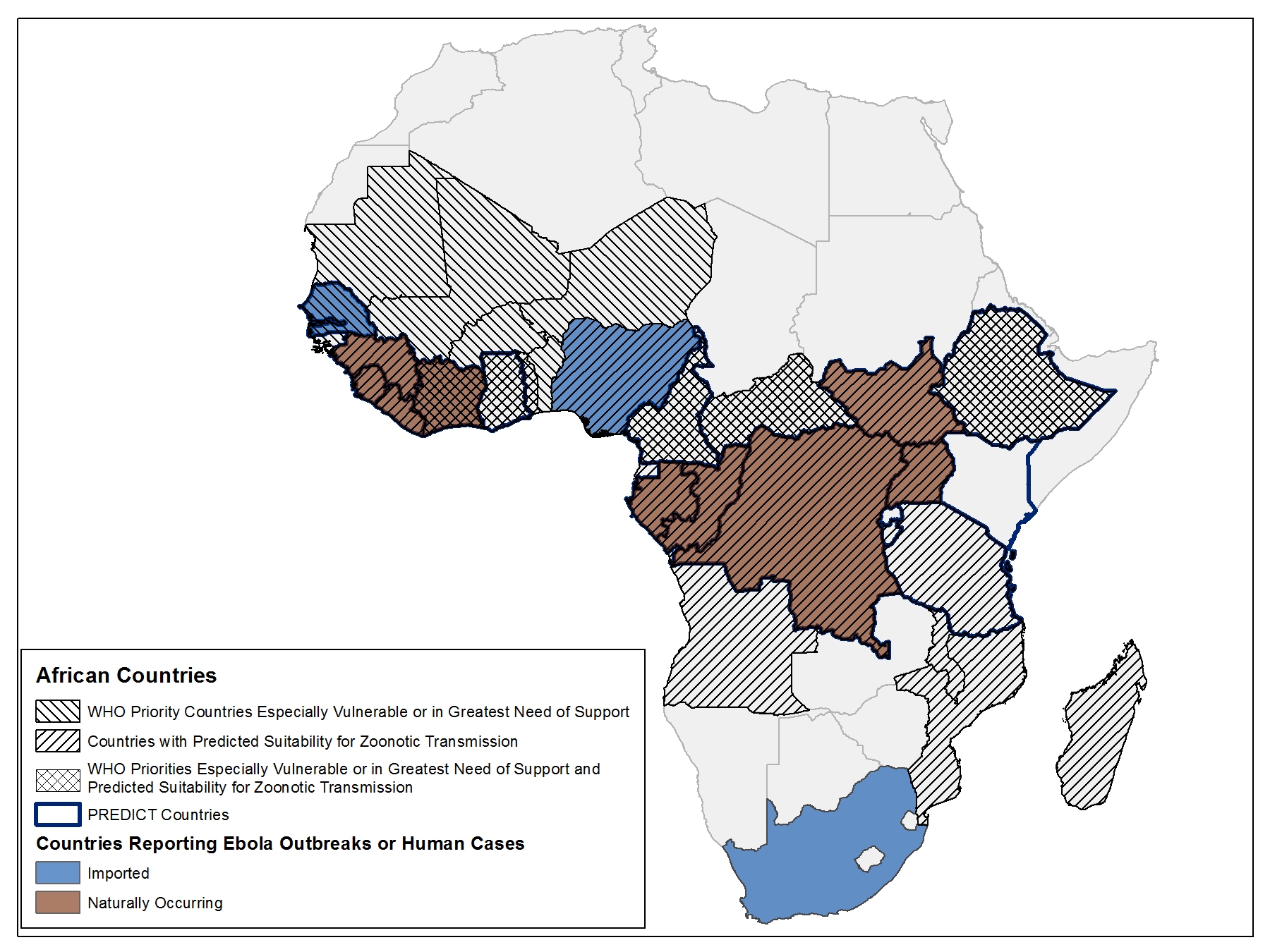
* Complete rapid capacity assessments of existing wildlife, livestock, and human disease surveillance systems and laboratories in conjunction with FAO (initially based on information available without engaging government officials; gaps will be addressed with full USG coordination)
* Conduct scoping visits to evaluate and identify implementing and supporting partners for surveillance and viral detection objectives
* Develop ministry level partnerships
* Evaluate health and disease surveillance capacities, needs, and risks
* Identify existing One Health platforms
* Develop relationships with partner organizations and laboratories/laboratory networks
* Introduce One Health surveillance through one or more trainings initially focused on needs identified through capacity evaluations
* Conduct feasibility and pilot studies for biological and behavioral surveillance, given permit acquisition
* Transfer knowledge and technologies for implementing PREDICT’s diagnostic approach (e.g. lab protocols and controls, etc.) to identified partner laboratories
* Integrate into existing networks (locally and regionally) if beneficial
* Explore linkages for epizone characterization and identify opportunities for targeted monitoring of zoonotic viruses in wildlife, livestock (via FAO), and human populations in collaboration with EPT2 partners, where appropriate

*Additional activities will build from this foundation and include the suite of activities listed under “Plans for Continuation in Existing Countries” above.*

**Specifically, initial activities PREDICT could implement for prevention, detection, and response for Ebola may include:**

* Specific surveillance for filoviruses and other viruses associated with VHF (Arenaviridae, Bunyaviridae, Flaviviridae, and Rhabdoviridae) in humans and animals, including One Health-based evaluation of any active syndromic surveillance programs for VHFs and FUOs and DUOs in people
* Identifying existing system(s) that could be used to evaluate early warning signals
* Characterizing the highest risk pathways for emergence of filoviruses (areas of rainforest, land conversion, and wild animal value chains) with optional behavioral surveillance to explore bushmeat trade risks for transmission and spread
* Assessments of laboratory capacity (in-country and regional) for detection of filoviruses and other viruses associated with VHF
* Collaboration with ministry partners to evaluate national capacity for Ebola outbreak investigation and response with emphasis on ecological investigations using a One Health approach and PREDICT’s viral diagnostic platform, and, in coordination with EPT partner P&R (if active in country), development of preparedness and response plans and capacity strengthening opportunities
* Evaluating opportunities for developing or expanding One Health platforms by investigating existing formal and informal multi-sectoral partnerships and networks among ministries and other organizations and the degree of cooperation between human and animal health sectors (again in partnership with EPT projects)
* Conducting surveillance for filoviruses and other viruses associated with viral hemorrhagic fevers in potential wildlife reservoirs, livestock (via FAO), and humans during and in-between outbreaks
* Investigation of factors promoting the spillover, amplification, and spread of Ebola viruses and other VHFs including: virus detection and spatial and temporal patterns; ecological niche modeling; characterization of risk along animal value chains; characterization of high-risk human behaviors; and enhanced spatial resolution of suspected wildlife reservoirs.

**Africa Countries and Ebola Virus Disease Vulnerabilities and Risk for Zoonotic Disease Transmission**

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*Figure 1. Map depicting PREDICT countries, countries considered vulnerable for Ebola Virus Disease by WHO and countries with suitability for zoonotic transmission of Ebola Virus Disease from niche models (Pigott et al. 2014).*

**Phase-in plans for new PREDICT Countries with Limited Engagement (Egypt, Ethiopia, Jordan, Kenya, Mongolia, South Sudan)**

**Initial activities will be restricted to:**

* Develop ministry level partnerships
* Rapid assessments of health and disease surveillance capacities, needs, and risks
* Identify existing One Health platforms
* Develop relationships with partner organizations and laboratories/laboratory networks
* Identify and characterize the MERS/Coronavirus epizone and prioritize locations for targeted surveillance activities
* Targeted and focused pilot surveillance of animal and human populations along prioritized pathways at the MERS/Coronavirus epizone

**Year 1 Egypt Specifics:**

**Lead PREDICT partner:**EcoHealth Alliance

**Existing or Potential Host Country Partners:**

Potential:

* Ministry of Health and the Central Public Health Laboratories (CPHL)
* Ministry of Agriculture and Land Reclamation and the Egyptian Wildlife Service
* NAMRU
* CDC

|  |  |  |
| --- | --- | --- |
| Ali Hussein Ahmed Hussein \* | Cairo University | Faculty and Chairman of Department of Virology |
| Yilma Jobre Makonnen\* | Food and Agriculture Organization | Team Leader, Emergency Centre for Transboundary Animal Diseases, Egypt |
| Dr. Markos Tibbo\* | Food and Agriculture Organization | Regional representative for animal health |

\*Is aware of the PREDICT2 project

**Existing or Anticipated Host Country Capacities:**

* The Virology Laboratory at the CPHL is the WHO National Influenza Centre, thus we anticipate the ability to conduct conventional PCR and maintain cold chain.

**Land Conversion for Commercialization and Animal Value Chain Pathways (top priority)**

* **Potential Sampling Targets** (assuming FAO willparticipate by sampling livestock in markets)**:**
  + People, dromedary camels, poultry and various species of bats.
* **Potential Sampling Locations:**
  + Birqash camel market in Giza.
  + Darau camel market in Asalam.

**Potential Year 1 Activities and Timelines (subject to USAID approval)**

* Initial engagement and scoping visits with Mission, including introductions to Government Partners including Rapid capacity assessment and surveillance planning*:* September 2015 (Ramadan is June 17-July 17 2015).
* Conduct standardized observational research and speak with key informants along the camel market value chain.
* Discuss potential/need for avian influenza work
* Visit and evaluate field sites for concurrent sampling potential

**Year 1 Jordan Specifics:**

**Lead PREDICT partner:**EcoHealth Alliance

**Existing or Potential Host Country Partners:**

Potential partners:

|  |  |  |
| --- | --- | --- |
| Dr. Munther Al-Refai | Ministry of Agriculture | Chief Veterinary Officer |
| Dr. Faisal Abdeldayem | Jordan Bio-Industries Center (vaccines and diagnostics) | General Manager |
| Dr. Ehab Abu-Basha | University of Science and Technology | Dean |
| Dr. Nisreen AL-Hmoud\* | Center for Excellence in Biosafety, Biosecurity and Biotechnology (BSL-3 lab), Royal Science Society) | Director |
| Dr. Rachel Dodeen | Ministry of Agriculture Liaison to Ministry of Health | One Health liaison |
| Dr. Ahmad Al-Majali | Veterinary School | Dean |
| Dr. Markos Tibbo\* | Food and Agriculture Organization | Regional representative for animal health |
| Dr. Najwa Khuri-Bulos | Jordan University | Dean of Academic Research |

\*Is aware of the PREDICT2 project

**Existing or Anticipated Host Country Capacities:**

* BSL-3 Laboratory at Royal Science Society
* Ministry of Agriculture with animal surveillance capacity and One Health linkages
* Previous experience with coronavirus surveillance in humans and animal populations

**Land Conversion for Commercialization and Animal Value Chain Pathways (top priority)**

* **Potential Sampling Targets** (assuming FAO willparticipate by sampling livestock in markets)**:**
  + Camels, bats, people
* **Potential Sampling Locations:**
* TBD

**Potential Year 1 Activities and Timelines (subject to USAID approval)**

* Initial engagement and scoping visits with Mission, including introductions to Government Partners: June 2015
* Rapid capacity assessment and surveillance planning June-Sept 2015
* Conduct preliminary standardized observational research and speak with key informants along the camel market value chain June 2015.
* Evaluate potential field sites for concurrent sampling potential
* Identify in-country partners currently working on Coronavirus surveillance

**Plans for Continuation in Existing PREDICT Countries (Bangladesh, Cambodia, Cameroon, China, DR Congo, Gabon, Indonesia, Laos, Malaysia, Myanmar, Nepal, Republic of Congo, Rwanda, Tanzania, Thailand, Uganda, Vietnam)**

* Identify and prioritize epizones and pathways for disease emergence, evolution, amplification, and spread and identify opportunities for targeted monitoring of zoonotic viruses in wildlife and human populations in coordination with EPT2 partners (CDC, FAO, OHW, P&R, WHO)
* Conduct sampling of wildlife, livestock (where appropriate and with FAO leading) and at-risk human populations with high levels of contact with animals at prioritized sites
* Initiate training of field teams for behavioral surveillance activities and investigate human behaviors and practices that may influence zoonotic disease risk
* Establish and strengthen capacity for, and conduct laboratory diagnostic testing on collected biological samples according to established protocols
* Develop and improve collaborations with host country partners to apply and extend diagnostic testing protocols to labs receiving samples from wildlife and people (FAO to facilitate the same for livestock)
* Coordinate with EPT2 partners (OHW and P&R when active) in capacity strengthening initiatives and towards operationalizing the One Health approach at the country and regional levels
* Support host country partners in preparations for outbreak response and in outbreak investigations as requested

**PREDICT-1 Success and Major Achievements (2009-2014)**

**PREDICT, implemented in over 20 countries, improved early detection and response to disease threats through** **five main objectives:**

1. Strengthening viral surveillance
2. Improving virus detection and discovery by developing laboratory and disease outbreak response capacities
3. Characterizing high-risk animal-human interfaces, behaviors, and drivers of pathogen spillover from animals to people
4. Optimizing predictive models for disease emergence and spread
5. Deploying cutting-edge information management and communication tools to advance a more integrated, global approach to sharing data from zoonotic virus surveillance

***Major Achievements***

*For more information please refer to the* PREDICT Final Report*, online at* [*report.predict.global*](http://www.vetmed.ucdavis.edu/ohi/predict/final_report.cfm)

**USAID’s PREDICT is the world’s most comprehensive zoonotic disease surveillance and capacity development program AND has also been recognized as the most productive viral detection and discovery effort to date – doubling the number of known mammalian viruses in just five years.**

From 2009-2014 PREDICT:

* **Engaged 59 government ministries and hundreds of scientific institutions, local organizations and other stakeholders to advance One Health Capacity**
* **Trained 2,500 individuals** (including government personnel, physicians, veterinarians, resource managers, lab technicians, hunters, students) on biosafety, surveillance, lab techniques, and disease outbreak investigations
* **Safely sampled more than 56,000 animals** (nonhuman primates, bats, rodents, and other wild animals including samples from bushmeat)at human-wildlife interfaces with the highest risk and opportunity for viral spillover from wildlife hosts to humans
* **Developed and optimized a low-cost diagnostic platform** for the detection and discovery of new viruses from target viral families **and safely operationalized this platform in 32 labs around the world**
* **Ran over 400,000 diagnostic tests**
* **Detected 984 novel and known viruses** (420 viruses from the Africa region); 959 viruses in wild animals and 34 viruses in human pilot studies (some of the same viruses in both people and wildlife)
* Thus far 815 of these viruses have been classified as novel or genetically divergent from known strains and species, and the remaining 169 viruses detected were previously known, based on genetic sequencing

PREDICT’s efforts resulted in more viruses detected in just five years than the total number of viruses previously recognized in mammals by the International Committee on Taxonomy of Viruses (ICTV; last version from ICTV in 2009 at beginning of PREDICT project).

PREDICT has detected many important human and animal pathogens including:

* SARS and MERS-related coronaviruses in bats in Asia and Africa
* Novel rhadovirus (Bas-Congo virus or BASV) in humans associated with acute hemorrhagic fever
* Ebola viruses in humans during multiple EVD outbreaks in Africa
* New coronaviruses numbering more than twice those previously acknowledged by the ICTV

PREDICT’s targeted, risk-based surveillance approach focusing on high-priority taxonomic wildlife groups (bats, non-human primates, rodents) was validated in analysis showing these groups as statistically more likely to test positive for virus when compared to other taxonomic groups sampled.

PREDICT’s novel diagnostic approach extends beyond the detection of novel viruses and can be successfully applied for the diagnosis of mystery diseases in medical hospitals or veterinary labs or other situations where knowledge on viral distribution is limited.

The team developed a new risk map, Hotspots II, based on a model that independently confirmed that the risk for zoonotic disease emergence increases with higher mammal diversity and that land-use type and land-use change are the other most important factors predicting emergence of zoonotic diseases of wildlife-origin.

We have integrated all data cleared for public release into a dynamic communication platform for partners, and surveillance and testing results can be viewed at [www.healthmap.org/predict](http://www.healthmap.org/predict).

As a testament to the degree to which PREDICT and its partners have truly advanced wildlife surveillance and supported scientific excellence and transparent communications, in-country staff and partners have been requested to serve on national disease task forces and to provide technical and expert assistance for several high-profile disease outbreak investigation and response efforts, including H7N9 influenza A, Nipah virus, MERS, and multiple EVD outbreaks.

PREDICT surveillance, pathogen detection and modeling activities have resulted in over 90 peer-reviewed, scientific publications that improve our understanding of zoonoses and the factors influencing their emergence. The wide distribution of the project findings from these scientific publications is assisting in cutting-edge global health improvements, including surveillance science, diagnostic technologies, understanding of viral evolution, and ecological driver identification.