

Office of the President

TO MEMBERS OF THE HEALTH SERVICES COMMITTEE:

DISCUSSION ITEM

For Meeting of October 20, 2020

SPEAKER SERIES – PREPARING FOR TOMORROW: UC DAVIS’ PREDICT AND ONE HEALTH WORKFORCE PROJECTS

EXECUTIVE SUMMARY

Executive Vice President Byington will introduce speakers whose work on research and interventions in today’s clinical settings will pave the way for expanding healthcare for current and future generations. First, Jonna Mazet, DVM, MPVM, PhD, a Professor of Epidemiology and Disease Ecology at the UC Davis School of Veterinary Medicine and Founding Executive Director of the UC Davis One Health Institute, will brief the Committee on her ongoing work with PREDICT – Pandemic Preparedness for Global Health Security. Second, Woutrina Smith, DVM, MPVM, PhD, Professor of Infectious Disease Epidemiology and Co-Director, UCGHI Planetary Health Center of Expertise, from UC Davis, will brief the Committee on preparing the global community to perform large-scale multidisciplinary health professional functions required for strengthening human biodefenses and for achieving global health security through the USAID One Health Workforce - Next Generation (OHW-NG) project.

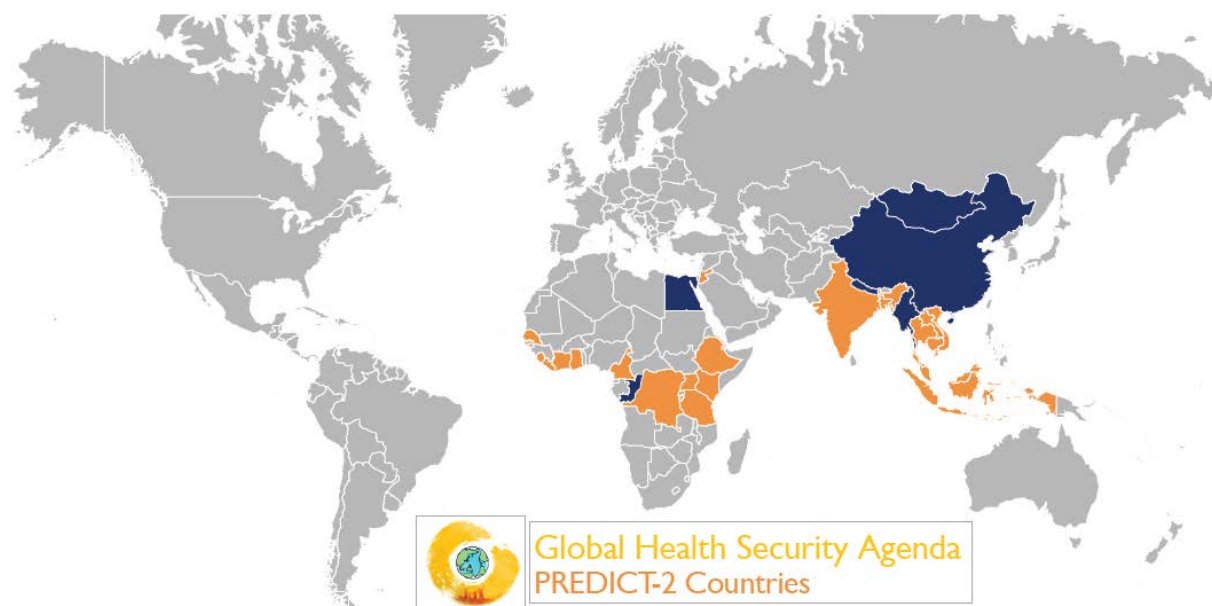
BACKGROUND

PREDICT – Pandemic Preparedness for Global Health Security

PREDICT was initiated in 2009 to strengthen global capacity for detection and discovery of viruses with pandemic potential that can move between animals and people, including filoviruses, such as ebolaviruses; influenza viruses; paramyxoviruses, such as Nipah virus; and coronaviruses, the family to which SARS-CoV-2, the virus responsible for the COVID-19 pandemic, belongs.

PREDICT activities supported emerging pandemic threat preparedness and the global health security agenda, primarily in Africa and Asia. A decade later, more than 30 countries around the world have stronger systems to detect, identify, prevent, and respond to viral threats, both known and novel. PREDICT teams have collected and tested samples from over 164,000 animals and people and detected almost 1,200 potentially zoonotic viruses, among them 160 novel coronaviruses, including multiple SARS- and MERS-like coronaviruses. The PREDICT-trained workforce, including field workers, data workers, and technicians at more than 60 national,

university, and partner laboratories, is one of the best response resources to assist with detection and response to COVID-19 and other emerging viruses.

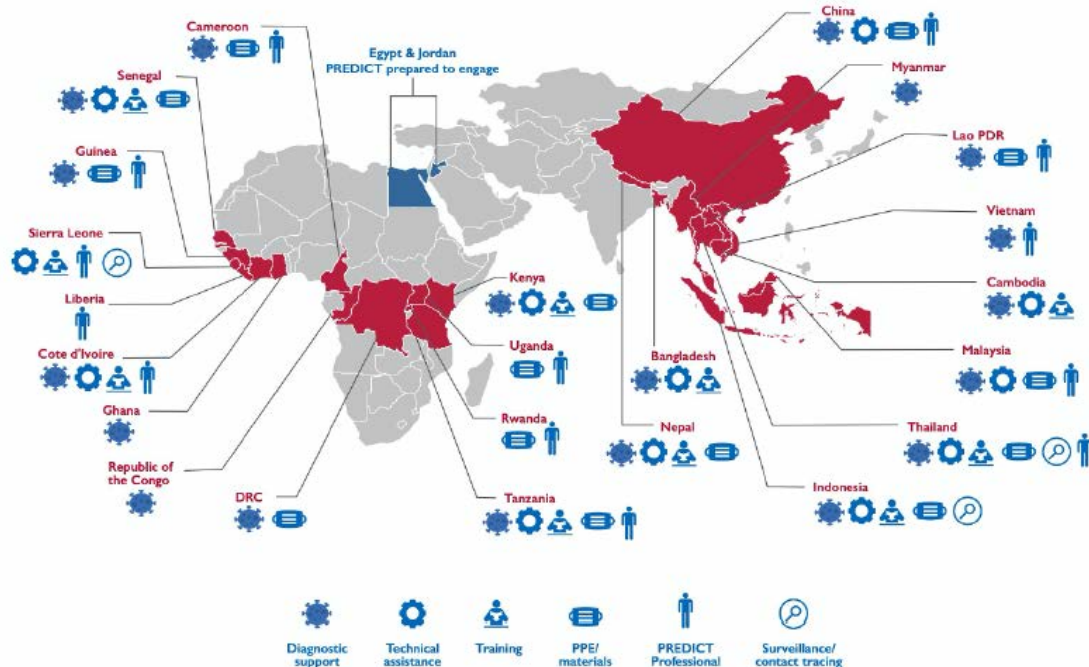


PREDICT Outbreak Response Activities, including COVID-19

PREDICT has been actively supporting partners in the U.S. and around the world by providing technical assistance and outbreak response support for the latest emergence of Disease X, COVID-19. The PREDICT team assisted 26 countries around the world in coronavirus detection and outbreak response by providing diagnostic support, technical assistance, and training, as well as funding for supplies and personal protective equipment (figure below). In the absence of an early specific assay targeting SARS-CoV-2, PREDICT's consensus-based PCR assay for coronaviruses was successfully optimized for the early detection of the virus in several countries in Asia.

For example, the first case of COVID-19 in Nepal was detected by PREDICT Nepal's implementing partner, the Center for Molecular Dynamics Nepal (CMDN), initially using PREDICT protocols in the absence of more specific assays at that time. PREDICT provided training on the detection of SARS-CoV-2 to the National Public Health Laboratory (NPHL) and also supplied it with testing reagents and PPE. The PREDICT field team trained over 500 doctors, nurses, and frontline healthcare providers in proper use of PPE. The team also worked closely with Nepal's Epidemiology and Disease Control Division (EDCD), Nepal Health Research Council (NHRC) and the World Health Organization in various COVID-19 related research and diagnostic activities, including whole genome sequencing of SARS-CoV-2 strains and community surveillance through environmental (sewage) sampling.

PREDICT SUPPORT DURING THE SARS-COV-2 PANDEMIC



With the emergence of SARS-CoV-2, PREDICT has leveraged its infrastructure to provide three key services to its participating laboratories:

- a. **EARLY DETECTION** – Helped raise the flag that coronaviruses have pandemic potential by providing critical data on the group of coronaviruses to which SARS-CoV-2 belongs, through collaborations with the PREDICT/China team and with National Institutes of Health (NIH).

Facilitated the use of available and cost-effective consensus-based PCR protocols to broadly detect viruses for early detection of SARS-CoV-2 in numerous countries. PREDICT network partners supported one another in interpretation of results and optimization of the assays for early detection of the first COVID-19 cases before a specific assay targeting the novel coronavirus was available.

- b. **PREPAREDNESS** – Networked with collaborating laboratories globally to share data and protocols and stressed the importance of international collaboration. Additionally, connected scientists in other PREDICT-participating countries and provided training, testing protocols, and funding for supplies and personal protective equipment.
- c. **ONGOING SUPPORT** – Global preparedness and response: providing technical assistance and testing support for early identification of cases, as well as readiness for other emerging viruses. Assisting in coronavirus detection and supporting government evaluations of potential cases throughout Asia, the Middle East, and Africa.

Between 2010 and 2019, PREDICT provided critical support to governments and international organizations during an additional 53 outbreaks in 16 countries. With many outbreaks consisting of spillovers from animal populations to humans, PREDICT's outbreak response strategy incorporated the One Health approach in providing critical assistance in disease investigations and response assistance. PREDICT helped tackle outbreaks affecting human, domestic animal, and wildlife populations at their source. Ebola virus disease (EVD) and viral hemorrhagic fevers were the most common outbreaks for which PREDICT provided assistance (26 percent), followed by animal/bird die-offs (15 percent) and influenza (nine percent). The vast majority of these outbreaks impacted human populations (66 percent) and non-human primates (17 percent), while animals, such as bats, wild birds, domestic animals and poultry, were also affected in other outbreaks.

Operationalizing One Health to prevent the need for outbreak response

In 2016, USAID and the PREDICT Consortium designed and implemented the Ebola Host Project (EHP) – the most comprehensive search for the animal origins of ebolaviruses and other closely related viruses since the disease first emerged in Africa in 1976. Ambitious in both scope and scale, EHP succeeded in revolutionizing the understanding of these viruses and changed the map of their distribution across Africa. PREDICT scientists were the first to discover a new ebolavirus species in a host prior to detection in an infected human or sick animal. The discovery of the Bombali virus in bats in Sierra Leone and the sequencing of the complete genome was officially published in the journal [Nature Microbiology in August 2018](#). The PREDICT team sampled more than 6,000 animals in Sierra Leone and performed laboratory tests to look for both known and unknown ebolaviruses. Further information on the Bombali virus in Sierra Leone can be found [here](#). PREDICT efforts also led to the detection for the first time in West Africa of the [highly-lethal Marburg virus](#) in bats in Sierra Leone. Both of these viruses were discovered and detected before an outbreak occurred in humans or animals, demonstrating that preemptive surveillance for viral threats can provide an early warning to help prepare risk reduction and disease prevention strategies. Further information on the Marburg virus in Sierra Leone can be found [here](#). In Liberia, the PREDICT team [detected Zaire ebolavirus](#) in a bat, marking the first time that this virus was detected in a potential host species in West Africa. These discoveries serve as frightening reminders that the cause of the 2014 West Africa Ebola epidemic and other potentially lethal filoviruses continue to lurk in the wild, awaiting opportunities for reemergence and devastating outbreaks.

Biography for Jonna Mazet

Jonna Mazet, DVM, MPVM, PhD, is a Professor of Epidemiology and Disease Ecology at the UC Davis School of Veterinary Medicine and Founding Executive Director of the UC Davis One Health Institute. Her work focuses on global health problem-solving for emerging infectious diseases and conservation challenges. She is active in international One Health education, service, and research programs, most notably in relation to pathogen emergence; disease transmission among wildlife, domestic animals, and people; and the ecological drivers of novel disease dynamics.

Currently, Dr. Mazet is the Co-Director of the U.S. Agency for International Development's One Health Workforce – Next Generation, an \$85 million educational strengthening project to

empower professionals in Central/East Africa and Southeast Asia to address complex and emerging health threats, including antimicrobial resistance and zoonotic diseases. She is the Principal Investigator of and served as the Global Director of the PREDICT Project for ten years, a greater than \$200 million viral emergence early warning project under USAID's Emerging Pandemic Threats Division. PREDICT served as an early-warning system-strengthening effort aimed at finding emerging viruses before they spread to humans. PREDICT provided the proof-of-concept for the Global Virome Project, for which Mazet serves on the board of directors.

She was elected to the U.S. National Academy of Medicine in 2013 in recognition of her successful and innovative approach to emerging environmental and global health threats and serves on the National Academies of Science, Engineering, and Medicine's Forum on Microbial Threats and chairs the Academies' One Health Action Collaborative. She was appointed to the National Academies Standing Committee on Emerging Infectious Diseases and 21st Century Health Threats, which was created to assist the federal government with critical science and policy issues related to the COVID-19 crisis and other emerging health threats.

USAID One Health Workforce - Next Generation (OHW-NG)

Emerging threats such as the 2019 novel coronavirus epidemic, which likely originated in wildlife and spread to humans, highlight the importance of a well prepared and technically skilled One Health workforce for disease prevention, detection, and response. The complex nature of these emerging health threats is a reminder that a large-scale multidisciplinary network of health professionals is required for strengthening biodefenses and for achieving global health security.

The USAID One Health Workforce - Next Generation (OHW-NG) project promotes global health security by empowering One Health University Networks in Africa and Southeast Asia to build the human resources and bolster the workforce for more effective disease surveillance and control. Using a variety of pre-service and in-service formats, including One Health student clubs and experiential learning, OHW-NG is fostering One Health competencies.

The Mission of the One Health Workforce

To empower the Africa One Health University Network (AFROHUN) and the Southeast Asia One Health University Network (SEAOHUN) to become global leaders in transforming the capacity of workforces to more effectively engage across sectors to prepare current and future health workers to prevent, detect, and respond to emerging disease threats of epidemic and pandemic importance.

AFROHUN

AFRICA ONE HEALTH UNIVERSITY NETWORK



8
COUNTRIES

17
UNIVERSITIES

24
INSTITUTIONS

SEAOHUN

SOUTHEAST ASIA ONE HEALTH UNIVERSITY NETWORK



7
COUNTRIES

80
UNIVERSITIES

152
FACULTIES

AFROHUN and SEAOHUN active (dark blue) and potential expansion (light blue) countries

Building on a foundation established over the past decade, OHW-NG is supporting AFROHUN and SEAOHUN to build scalable and sustainable systems for training and empowering human resources to combat complex health threats in the world's most vulnerable areas for disease emergence. OHW-NG will also work with the networks to provide programs and resources that build One Health competencies, enhance AFROHUN and SEAOHUN's adaptive response and decision-making capabilities, and support development of strategies for long-term organizational sustainability and self-reliance.

A Global Consortium

The One Health Workforce – Next Generation Consortium consists of AFROHUN (formerly One Health Central and Eastern Africa, or OHCEA) and SEAOHUN, which represent over 100 universities from across Africa and Southeast Asia, respectively, as well as global leaders in One Health from top-ranked institutions and private partners across North America, including UC Davis, UC Berkeley, UC Irvine, Columbia University, University of New Mexico, EcoHealth Alliance, and Ata Health Strategies. Founded in 2011 with the support of USAID, AFROHUN and SEAOHUN have been empowering universities to train the present and future health workforce to effectively prevent, detect, and respond to threats posed by emerging infectious diseases and antimicrobial resistance. This \$85 million project is led by the One Health Institute at UC Davis, as a five year endeavor from 2019 to 2024.

COVID-19 Engagements Around the World

As a partnership involving faculty from the UC system as well as at universities across Africa and Southeast Asia, the OHW-NG project has been supporting COVID-19 activities over the past six months as the pandemic emerged. As the outbreaks were unfolding in various regions, a series of 90 minute interactive ECHO virtual community of practice (vCoP) sessions were held every two weeks to provide a globally-connected forum for hot topic updates and regional sharing of challenges and successes involving SARS-CoV-2. In more recent months a variety of activities have been conducted, ranging from e-learning to in-person formats, and involving innovations such as using robots in healthcare settings, working with Student One Health

Innovation Clubs and faculty on risk communication and community engagement, monitoring and evaluation of behavioral change, and participating in national task force activities.

UC Global Health Institute

The USAID One Health Workforce – Next Generation project was originally envisioned by UC Davis PI Woutrina Smith as a multi-campus consortium, and the ongoing collaborations across UC campuses that were in place as part of the UC Global Health Institute made a rapid process of proposal development and then launching implementation a year ago highly successful. Working across campuses and disciplines, UC faculty representing veterinary medicine, public health, business, environmental economics, and gender issues have come together for COVID-related One Health work in Africa and Southeast Asia in recent months.

Over the past ten years, the UC Global Health Institute has worked to unite faculty, students, and stakeholders with an interest in global health, and has developed a suite of online courses that are available across the UC system as well as leveraging funding originally provided by the Council of Chancellors into a diversified portfolio of federal, State, and privately supported programs. Now based at the UC Office of the President, the UC Global Health Institute, along with its two centers, the Planetary Health Center of Expertise and the Women’s Health, Gender, and Empowerment Center of Expertise, are positioned for a new chapter to raise awareness about how global health is local, both in California and internationally, and to create new synergies for collaborations across campuses. Professor Smith leads the UCGHI Planetary Health Center of Expertise, and Professor Mazet is Vice-Chair of the UCGHI Board. More information is available at <https://ucghi.universityofcalifornia.edu/>.

Biography for Woutrina Smith

Dr. Woutrina Smith grew up in Alaska and earned her Bachelor’s degree from Pomona College in Claremont, California. Her veterinary professional and graduate training were at the University of California, Davis, School of Veterinary Medicine, followed by accepting a faculty position there in 2007. As a Professor of Infectious Disease Epidemiology, Dr. Smith uses a One Health approach that works across disciplines and sectors to foster team-based problem-solving that addresses the complexity of human, animal, plant, and environmental factors. She brings this One Health approach into her research program as well as the teaching that she provides for professional, graduate, and undergraduate audiences.

Dr. Smith has published over 90 peer-reviewed articles and received research support from diverse sources including the National Institutes of Health, the National Science Foundation, the U.S. Agency for International Development, the U.S. Defense Threat Reduction Agency, and the Bill & Melinda Gates Foundation. She is Co-Director for the Planetary Health Center of Expertise (PHCOE) within the multi-campus UC Global Health Institute (UCGHI) that is now based at UCOP. The Planetary Health Center of Expertise aims to connect faculty, students, and stakeholders across all ten UC campuses to raise awareness and identify transformative solutions to coupled health-environment challenges. Dr. Smith has developed and leads multi-campus online courses involving global population, health, and environment issues for UC undergraduates, and she leads the UC Davis Sustainability, Health and Environment Working

Group that partners with faculty at professional schools across the UC system to enhance curricular offerings that incorporate climate and health topics as well as online technologies.

Dr. Smith launched her global health research program in Tanzania in 2007 as part of the Health for Animals and Livelihood Improvement Project, a partnership between UC Davis, Sokoine University of Agriculture, and Ifakara Health Institute, with a special focus on addressing zoonotic disease issues in East Africa. Since then she has worked in countries across Africa, Southeast Asia, and Latin America to investigate waterborne pathogen pollution as well as other foodborne, vectorborne, and airborne zoonotic disease epidemiology problems. Currently she is Technical Director for the \$85 million USAID One Health Workforce – Next Generation Project, which has a 17-country portfolio, networking over 100 universities together to pilot innovative training methods that build One Health competencies for pre-service and in-service audiences.