THE IMPACT OF CLIMATE CHANGE ON INFECTIOUS DISEASES

8TH ANNUAL GLOBAL HEALTH AND INFECTIOUS DISEASES CONFERENCE
April 22 & 23 | 10 a.m.-1:15 p.m.
10 a.m. Welcome
Victor Dávila-Román, MD & David Fike, PhD

10:10 a.m. WashU COVID Update
Matifadza G. Hlatshwayo, MD, MPH
Division of Infectious Diseases, Washington University in St. Louis

10:25 a.m. Introduction

10:35 a.m. Presentations and Q&A

- **Warmer and Wetter: Infectious Diseases on the Move in a Changing Climate**
  Kristie Ebi, PhD, MPH
  Department of Global Health, School of Public Health, University of Washington

- **Climate Change Impacts on Human Health: Diarrheal Disease, Surface Water Influences, and Infrastructure Vulnerability in Flood Pulse Systems in Africa**
  Kathleen Alexander, DVM, PhD
  Professor, Fisheries and Wildlife Conservation, Virginia Tech
  Director, Chobe Research Institute, Kasane Botswana

11:25 a.m. Break

11:35 a.m. Presentations and Q&A

- **Historical Correlations Among Volcanic Eruptions, Climate Change, and Pandemics**
  Michael Wysession, PhD
  Professor, Department of Earth and Planetary Sciences, Washington University

- **A Time of Great Opportunities – One Health in an Age of Climate Change, Extinctions, and a Pandemic**
  Sharon L. Deem, DVM, PhD, Dipl ACZM
  Director, Institute for Conservation Medicine, Saint Louis Zoo

12:25 p.m. Table Conversations
- Kathleen Alexander, DVM, PhD
- Sharon L. Deem, DVM, PhD, Dipl ACZM
- Kristie Ebi, PhD, MPH
- Michael Wysession, PhD

1:10 p.m. Concluding Remarks
Friday, April 23

10 a.m.  Welcome and Introduction

10:10 a.m.  Presentations and Q&A

  *Climate Change, Conflict and Connectivity across Borders: Sociocultural Factors Affecting the Frontline of Public Health Response*
  Rebecca Merrill, PhD, MHS
  Division of Global Migration and Quarantine, Center for Disease Control and Prevention

  *Improving Predictions of West Nile Virus Risk Through Recognition of the Scale-Dependence of Weather Drivers*
  Sara Paull, PhD
  Assistant Professor, Environmental & Occupational Health, Colorado School of Public Health

  *Climate Change: Be Prepared and Act!*
  Steve Mahfood
  Former Head of the Missouri Department of Natural Resources

11:30 a.m.  Break

11:40 p.m.  Panel Discussion:

  *Lessons Learned from COVID to Inform the Impact of Climate Change on Infectious Disease*

12:25 p.m.  Table Conversations

  - Steve Mahfood
  - Rebecca Merrill, PhD, MHS
  - Sara Paull, PhD

1:10 p.m.  Concluding Remarks
Dr. Kathleen Alexander has been conducting research in East and Southern Africa for over twenty years. She worked for the Government of Botswana as both the Chief of the Wildlife Veterinary Unit in the Department of Wildlife and National Parks and later, as the Ecological Advisor to the Office of the President of Botswana and the Attorney Generals Chambers. Most recently, she served on the Botswana Presidential COVID Task Force as a scientific advisor. She has spent most of her professional life working with local communities integrating scientific approaches with traditional understanding in order to identify interventions for improved rural livelihoods. She is a member of both the World Conservation Union’s Wildlife Health Specialist Group as well as the Commission for Ecosystem Management. She moved to Department of Fisheries and Wildlife Conservation at Virginia Tech in 2007 where she continues to conduct research in her long-term Botswana study site on the dynamics of emerging infectious disease at the human-animal interface.

**Climate Change Impacts on Human Health: Diarrheal Disease, Surface Water Influences, and Infrastructure Vulnerability in Flood Pulse Systems in Africa**

**Learning Objectives:**
1. Assess environmental drivers for their potential to influence pathogen transmission dynamics.
2. Identify the linkages that can exist between meteorology and flood pulse dynamics as well as water quality and waterborne disease.
3. Evaluate the potential impact of climate change on environmentally linked disease syndromes such as diarrheal disease.
Sharon L. Deem, DVM, PhD, Dipl ACZM
Director, Institute for Conservation Medicine, Saint Louis Zoo

Dr. Deem has served as the first director of the Saint Louis Zoo Institute for Conservation Medicine (ICM) since it launched in 2011. The ICM takes a holistic approach to wildlife conservation, public health, and sustainable ecosystems to ensure healthy animals and healthy people. In addition to global One Health/Conservation Medicine research projects, Deem is training the next generation One Health practitioners. In 2018, Deem delivered a TEDx talk on One Health – the Ties that Bind. She has published extensively on conservation and health topics. Her first textbook, “Introduction to One Health: An Interdisciplinary Approach to Planetary Health,” which she co-wrote with Drs. Kelly Lane-deGraaf and Elizabeth Rayhel, was published in January 2019.

A Time of Great Opportunities – One Health in an Age of Climate Change, Extinctions, and a Pandemic

Learning Objectives:
1. The One Health concept and how dependent human health is on animal and environmental health.
2. How COVID-19 was predictable and preventable and will come again without changes.
3. How climate change factors in to zoonoses and the other public health challenges of today.

Kristie Ebi, PhD, MPH
Professor, Department of Global Health, School of Public Health, University of Washington

Professor Kristie L. Ebi has nearly 25 years of experience conducting research and practice on the health risks of climate variability and change. She focuses on understanding sources of vulnerability, quantifying current and projecting future health risks of climate change, designing adaptation policies and measures to reduce the risks of climate change in multi-stressor environments, and identifying the health co-benefits of mitigation policies and technologies. Modeling future risks requires integrating micro- to macro-level exposures with processes that influence disease occurrence. Ebi has and continues to support multiple countries in Central America, Europe, Africa, Asia and the Pacific in assessing their vulnerability and implementing adaptation measures.

Warmer and Wetter: Infectious Diseases on the Move in a Changing Climate

Learning Objectives:
1. The geographic range, seasonality, and intensity of transmission of many vector borne diseases are at least partially determined by temperature and precipitation.
2. Ongoing climate change is altering temperature and precipitation patterns in ways that can facilitate changes in the burden of vector borne diseases.
3. Evidence shows that climate change has already affected the numbers of cases of selected vector borne diseases.
4. Additional climate change is projected to affect future numbers of cases of infectious diseases.
Rebecca Merrill, PhD, MHS  
Division of Global Migration and Quarantine, Centers for Disease Control and Prevention  

Rebecca Merrill is an epidemiologist and lead of the Global Border Health Team within the U.S. Centers for Disease Control and Prevention’s Division of Global Migration and Quarantine. In this position, she collaborates with governments and partners to design and incorporate into public health systems creative, multi-sectoral border health approaches to mitigate the international spread of communicable disease. Merrill’s particular area of interest involves better characterizing population mobility pathways to facilitate more effectively integrating mobile populations in public health surveillance, preparedness, and response initiatives and to improve cross-border collaboration strategies. She received her Masters of Health Science and Doctorate in maternal and child nutrition from Johns Hopkins Bloomberg School of Public Health and continued her academic work with Johns Hopkins for many more years while living in Bangladesh managing large, field-based research programs. She joined CDC in 2013 as an Epidemic Intelligence Service Officer.

**Talk - Climate Change, Conflict, and Connectivity Across Borders: Sociocultural Factors Affecting the Frontline of Public Health Response**

**Learning Objectives:**
1. Cross-border collaboration between governments and public health stakeholders must be responsive to sociocultural factors of population movement to effectively reduce the international spread of disease.
2. Climate change and civil conflict have an impact on inter- and intra-regional community connectivity and associated communicable disease spread.
3. Public health practitioners should incorporate a more prospective approach to risk assessments during outbreak preparedness and response to more effectively tailor mitigation strategies.

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Steve Mahfood  
Former Head of the Missouri Department of Natural Resources  

Steve Mahfood has a 45 year track record as an innovator and leader in the environmental, energy and natural resource fields. Steve has a deep appreciation for the environment and has broad and diverse experience that spans several continents. After graduating from Rutgers University College of Environmental Science he worked in the environmental planning and public health fields before beginning work for many years in North Africa and the Middle East in environmental and public health programs for Project Hope and CARE/UN. Mahfood was appointed for eight years by successive governors as Cabinet Secretary to lead the Missouri Department of Natural Resources (DNR). After leaving the Missouri DNR he established a dynamic small company, Mahfood Associates LLC. As Principal of Mahfood Associates, he devoted himself as Governmental Affairs Advisor to the Missouri Chapter of the Nature Conservancy for over 12 years and has quietly assisted many other influential organizations on environmental, energy, natural resource, carbon management and climate change issues.

**Climate Change: Be Prepared and Act!**

**Learning Objectives:**
1. Knowing the Risks and being part of the solution  
2. Preparedness  
3. Understanding Adaptation

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Michael Wysession, PhD

Professor, Department of Earth and Planetary Sciences, Washington University in St. Louis

In addition to professor of Earth and Planetary Sciences, Dr. Michael E. Wysession also serves as executive director of the Center for Teaching and Learning at Washington University in St. Louis. An established leader in seismology and geoscience education, Wysession is noted for his research on the composition of Earth’s deep mantle, particularly the core-mantle boundary. He has coauthored more than 30 textbook volumes, ranging from Pearson’s national elementary and middle school science programs to the leading graduate-level Introduction to Seismology, Earthquakes, and Earth Structure. Wysession’s research and science literacy work have been recognized through a Packard Foundation Fellowship, a National Science Foundation Presidential Faculty Fellowship, the Innovation Award of the St. Louis Science Academy, the Distinguished Faculty Award of Washington University, the Ambassador Award from the American Geophysical Union, of which he is a Fellow, and the Frank Press Award from the Seismological Society of America.

**Historical Correlations Among Volcanic Eruptions, Climate Change, and Pandemics**

**Learning Objectives:**

1. Understand the interconnectedness of Earth systems and how a change in one part of an Earth system can have significant human impacts at other times and places.
2. Develop this understanding through examples of how volcanic eruptions have altered climate conditions that have allowed for the spread of pandemics.
3. Learn of how the early histories of Missouri and St. Louis were directly impacted by the eruption of Mt. Tambora in 1815 and the global cholera pandemic that ensued.

Sara Paull, PhD

Assistant Professor, Environmental & Occupational Health, Colorado School of Public Health

Sara Paull is a disease ecologist whose research addresses questions at the interface of ecology and public health. She is broadly interested in studying how interactions between humans, animals and the environment influence infectious disease risk. Much of her research focuses on how climate change could affect pathogen transmission. She is the disease ecologist for the National Ecological Observatory Network in Boulder, Colorado as well as a part-time clinical research professor at the Colorado School of Public Health.

**Improving Predictions of West Nile Virus Risk Through Recognition of the Scale-Dependence of Weather Drivers**

**Learning objectives:**

1. The dominant predictors of WNV outbreaks can depend on the temporal and spatial scales analyzed.
2. Temperature varies dramatically across small spatial scales, with large implications for predicted disease risk.
3. Consideration of scale and nonlinear relationships is essential for predicting disease risk under future climate change.
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